RAILROAD CURVE TABLES

HENDERSON

RAILROAD CURVE TABLES

CONTAINING

A COMPREHENSIVE TABLE OF FUNCTIONS OF A ONE-DEGREE CURVE, WITH CORRECTION QUANTITIES GIVING EXACT VALUES FOR ANY DEGREE OF CURVE

TOGETHER WITH

VARIOUS OTHER TABLES AND FORMULAS, INCLUDING RADII, NATURAL SINES, COSINES, TANGENTS, COTANGENTS, ETC.

TO WHICH IS ADDED

A METHOD OF FINDING ANY FUNCTION OF A CURVE OF ANY DEGREE OR RADIUS WITHOUT A FIELD BOOK

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PREFACE.

This little volume is intended to supplement existing field books. Consequently the usual theoretical discussions have been omitted and the book reduced in size as much as possible. It is believed, however, that these tables will prove amply sufficient to meet the demands of the field engineer.

The correction quantities are original in that they are applicable to any function of a curve and are independent of the central angle. The rectangular co-ordinates, X and Y, are believed to be entirely new. The appendix, "Field Engineering Without a Field Book," is here presented for the first time.

The computations have been made with extreme care. The approximation of 5,730 feet for the radius of a one-degree curve, used in several previous books, has not been permitted in the preparation of the present volume.

While every effort has been made to secure absolute accuracy in the tables, the author makes no claim to infallibility. Should any errors be discovered, however slight, a favor will be conferred by reporting the same to the publishers.

Chicago, July, 1906. R. S. HENDERSON.

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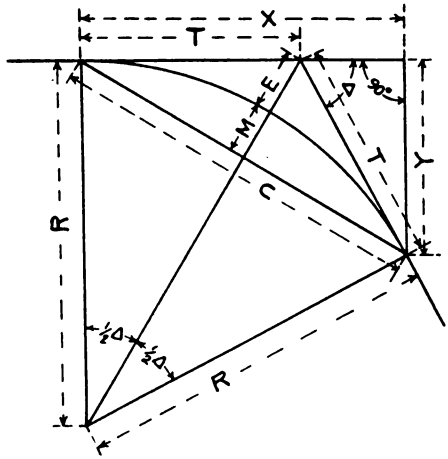
EXPLANATION OF TERMS.



FORMULAS FOR A 1° CURVE.

Radius = $R = \frac{50}{\sin 0°30'} = 5729.65$

Sub-tangent = $T = R \tan \frac{1}{2}\Delta$

External Secant = $E = R \operatorname{exsec} \frac{1}{2}\Delta$

Long Chord = $C = 2R \sin \frac{1}{2}\Delta$

Middle Ordinate = $M = R \operatorname{vers} \frac{1}{2}\Delta$

Rectangular Co-ordinate $X = R \sin \Delta$

Rectangular Co-ordinate $Y = R \operatorname{vers} \Delta$

Length of Curve = $L = 100\Delta$

USE OF TABLES.

1. To find the functions of a 6° curve if $\Delta = 47°35'$.
(Tables I, II and III.)

For a 1° curve.		For a 6° curve.
$T = 2526.1$	Cor. $= 0.19$	$T = \frac{2526.1}{6} + 0.19 = 421.24$
$E = 532.14$	Cor. $= 0.04$	$E = \frac{532.14}{6} + 0.04 = 88.73$
$C = 4622.8$	Cor. $= 0.34$	$C = \frac{4622.8}{6} + 0.34 = 770.81$
$M = 486.91$	Cor. $= 0.04$	$M = \frac{486.91}{6} + 0.04 = 81.19$
$X = 4230.0$	Cor. $= 0.31$	$X = \frac{4230.0}{6} + 0.31 = 705.31$
$Y = 1864.9$	Cor. $= 0.14$	$Y = \frac{1864.9}{6} + 0.14 = 310.96$
$L = 47 \times 100 + 58.33 = 4758.33$		$L = \frac{4758.33}{6} = 793.06$

2. To find the functions of a curve of 220' radius if $\Delta = 92°23'$.
(Tables I, II and IV.)

For a 1° curve.	For a curve of 220' radius.
$T = 5973.1$	$T = 5973.1 \times .038397 = 229.35$
$E = 2547.2$	$E = 2547.2 \times .038397 = 97.80$
$C = 8269.7$	$C = 8269.7 \times .038397 = 317.53$
$M = 1763.3$	$M = 1763.3 \times .038397 = 67.71$

No correction required. Degree of curve $= 26°16.4'$

$$L = \frac{100\left(92\frac{23}{60}\right)}{26\frac{16.4}{60}} = 351.62$$

If chaining begins at one end of curve the sub-chord at the other end will be $51.62 + \left(\frac{26.3}{10}\right)^2 \times .048 = 51.62 + 0.33 = 51.95$, making $L = 351.95$ instead of 351.62

3. Example showing application of the 1° curve functions in passing obstacles. (Tables I, II and III.)

Given two tangents intersecting opposite to and 247' from a building. $\Delta = 59°43'$. Station of P.I. = 48+11.6

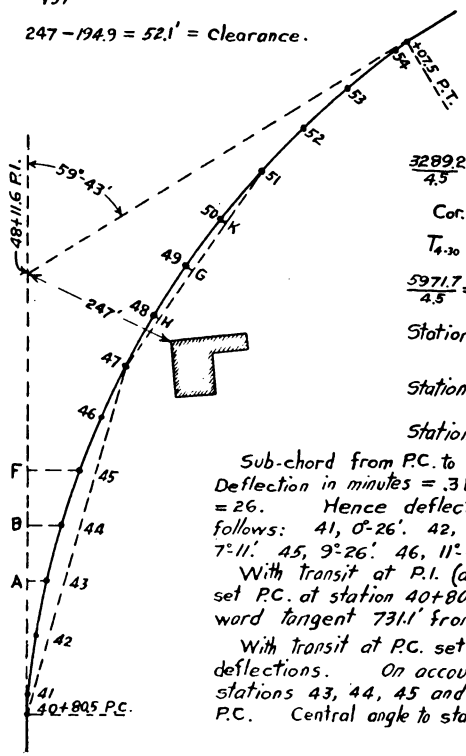
Required to run in the flattest curve of even degree or half degree that will clear the building by not less than 50'.

Maximum allowable value of $E = 247 - 50 = 197'$

For $\Delta = 59°43'$ $T_1 = 3289.2$, $E_1 = 876.97$ and $L_1 = 5971.7$

$\frac{876.97}{197} = 4.45$ Hence use 4°-30' curve. $\frac{876.97}{4.5} = 194.9 = E_{4-30}$.

$247 - 194.9 = 52.1'$ = Clearance.



$\frac{3289.2}{4.5} = 730.93$

Cor. = 0.18

$T_{4-30} = 731.11$

$\frac{5971.7}{4.5} = 1327.0 = L_{4-30}$

Station of P.I. = 48+11.6

T = 7+31.1

Station of P.C. = 40+80.5

L = 13+27.0

Station of P.T. = 54+07.5

Sub-chord from P.C. to Station 41 = 19.5

Deflection in minutes = .3 D x sub-chord = .3 x 4.5 x 19.5 = 26. Hence deflections from P.C. are as follows: 41, 0°-26'. 42, 2°-41'. 43, 4°-56'. 44, 7°-11'. 45, 9°-26'. 46, 11°-41'. 47, 13°-56'.

With transit at P.I. (after Δ has been measured) set P.C. at station 40+80.5 and set P.T. on forword tangent 731.1' from P.I.

With transit at P.C. set stations 41 and 42 by deflections. On account of obstacles on line stations 43, 44, 45 and 46 are invisible from P.C. Central angle to station 43 = 2 x (4°56') = 9°-52'.

For $\Delta = 9°52'$ $X_1 = 981.81$ $\frac{981.81}{4.5} = 218.2 = X_{4\cdot30}$

$Y_1 = 84.75$ $\frac{84.75}{4.5} = 18.83 = Y_{4\cdot30}$

Calling P.C. station 0 set a point A at 2+18.2 on subtangent. Set station 43 by measuring 18.83' from A and 100' from station 42.

Central angle to station 44 = (9°-52') + (4°-30') = 14°-22'

For $\Delta = 14°22'$ $X_1 = 1421.7$ $\frac{1421.7}{4.5} = 315.9 = X_{4\cdot30}$

$Y_1 = 179.18$ $\frac{179.18}{4.5} = 39.82 = Y_{4\cdot30}$

Set a point B at station 3+15.9 on subtangent. Set station 44 by measuring 39.82' from B and 100' from station 43.

Similarly for station 45, $\Delta = 18°52'$, $X_1 = 1852.8$, $X_{4\cdot30} = 411.7$, $Y_1 = 307.83$, $Y_{4\cdot30} = 68.41$ Set a point F at station 4+11.7 on sub-tangent.

For station 47, $\Delta = 27°52'$ $C_1 = 2759.3$ $\frac{2759.3}{4.5} = 613.18$ Cor. = 0.15

613.18 + 0.15 = 613.33 = $C_{4\cdot30}$. Set station 47 by chord distance 613.33' from P.C. and deflection 13°-56'.

Obstacles on line prevent setting station 45 by measuring from station 44 or 46. With transit at F set station 45 by measuring 68.41' at right angles to sub-tangent.

With transit at station 47 set stations 46 and 48 by deflections. On account of obstacles on line stations 49 and 50 are invisible from station 47. Central angle station 47 to 51 = 18°-0'.

For $\Delta = 18°0'$ $C_1 = 1792.6$ $\frac{1792.6}{4.5} = 398.36$ Cor. = 0.10 $398.36 + 0.10$

$= 398.46 = C_{4\cdot30}$. $M_1 = 70.54$ $\frac{70.54}{4.5} = 15.68 = M_{4\cdot30}$

Set station 51 by chord 398.46' from station 47 and deflection 9°-0' from tangent at station 47.

Set a point H on the chord 100' from station 47 and measure distance from H to station 48. Set a point K on the chord 100' from station 51. Set station 50 by measuring 100'

from station 51 and the same distance from K as H is from station 48. Set a point G at center of chord. Set station 49 by measuring 15.68' from G and 100' from station 50.

With transit at P.T. set stations 52, 53 and 54 by deflections and check on station 51.

In the foregoing example the corrections are used only where necessary. A little practice will indicate where they should be used and where they may be omitted.

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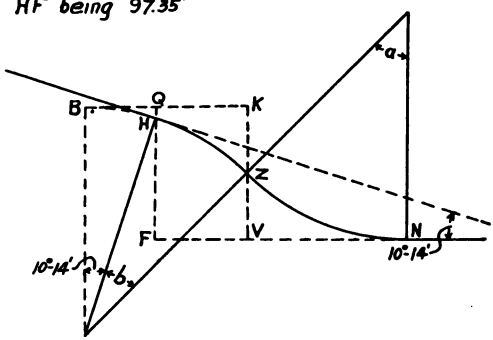
4. Use of co-ordinates X and Y as applied to reversed curves.

Given two tangents making an angle of 10°-14' with each other. Required to connect them with an 8° reversed curve. The curve is to leave the first tangent at a point H, the perpendicular distance HF being 97.35'



If the curve HZ is produced beyond H to B increasing the central angle by 10°-14' the tangent to the curve at B will be parallel to the second tangent FN.

For $\Delta = 10°\text{-}14'$ $X_1 = 1017.9$ $\frac{1017.9}{8} = 127.24$ Cor. = 0.10 $127.24 + 0.10 = 127.34 = BQ$. $Y_1 = 91.14$ $\frac{91.14}{8} = 11.39 = QK$ $97.35 + 11.39 = 108.74 = QF = KV$. $\frac{108.74}{2} = 54.37 = KZ = ZV$ $54.37 \times 8 = 434.96$ Cor. $= .04 \times 8 = .32$

$434.96 - .32 = 434.64 = Y_1$ for central angle a. Hence $a = 22°\text{-}28'$. $b = (22°\text{-}28') - (10°\text{-}14') = 12°\text{-}14'$

For $\Delta = 22°28'$ $X_1 = 2189.6$ $\frac{2189.6}{8} = 273.70$ Cor = 0.22 $273.70 + 0.22 = 273.92 = VN = BK$. $273.92 - 127.34 = 146.58 = QK = FV$.

Length of curve $HZ = \frac{1223.33}{8} = 152.9$

Length of curve $ZN = \frac{2246.67}{8} = 280.8$

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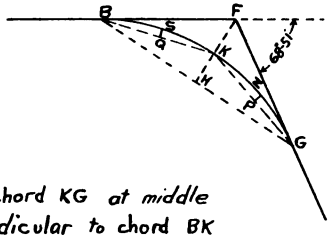
5. Use of *middle* ordinates in plotting a curve of *large* central angle.

Given a 5° curve. $\Delta = 68°51'$.



Bisect chord BG at H

Connect H and F.

$HK = \frac{1003.5}{5} = 200.7$

$KF = \frac{1216.5}{5} = 243.3$

Draw PZ perpendicular to chord KG at middle point P. Draw QS perpendicular to chord BK at middle point Q.

$QS = PZ = \frac{256.61}{5} = 51.3$

Thus by successive bisection any number of points may be plotted on the curve.

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6. Use of X, Y and C in plotting a curve of small central angle.

Given a 3° curve. $\Delta = 21°17'$.

Required to plot points on the curve 50' apart.

Calling P.C. station 0 gives the following values of X, Y and C for one half of the curve:

Station	Δ	X	Y	C
0+50	1-30	50.0	0.7	50.0
1	3-0	100.0	2.6	100.0
+50	4-30	149.8	5.9	150.0
2	6-0	199.6	10.5	199.9
+50	7-30	249.3	16.3	249.8
3	9-0	298.8	23.5	299.7
+50	10-30	348.0	32.0	349.5

Calling P.T station 0 use the same values of X, Y and C for the other half of the curve.

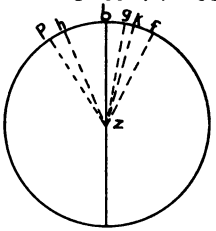
7. Use of long chords in plotting a transit line. Required to plot the following notes:

Tangent	Length	Angle	Total Angle	C. for Total Angle
b	5500'			
f	3973	28°-32' R.	28°-32' R.	2824.0'
g	2800	16-19 L.	12-13 R.	1219.4
h	5632	38-44 L.	26-31 L.	2628.1
K	3826	40-54 R.	14-23 R.	1434.6
P	3784	47-16 L.	32-53 L.	3243.4

The length and angle of the various tangents are measured, the total angles computed and C. taken from table II.

At a convenient point on the map and to a large scale draw a circle with radius of 5729.65'

Through the center z of the circle draw a line parallel to tangent b, intersecting the circumference at point b.



Using scale to which circle was drawn lay off chords as follows:

bf = 2824.0' to the right of b
bg = 1219.4 " " " " "
bh = 2628.1 " " left " "
bK = 1434.6 " " right " "
bp = 3243.4 " " left " "

Draw tangent f parallel to zf, tangent g parallel to zg, tangent h parallel to zh etc.

Draw lengths of tangents to scale of map.

8. Use of tables VI and VII.

Table VI gives natural sines and cosines and table VII natural tangents and cotangents to seven decimals for angles varying by ten minutes.

The maximum error resulting from direct interpolation of intermediate angles is one unit in the sixth decimal place for table VI and four units for table VII. Hence these tables are more accurate than five-place tables varying by single minutes.

Tangents are given only for angles under 45° and cotangents for angles over 45° since direct interpolation is not permissable outside of these limits.

To find the tangent of an angle greater than 45° take the reciprocal of the cotangent of the angle.

To find the cotangent of an angle less than 45° take the reciprocal of the tangent of the angle.

TABLES.

TABLE I.—MINUTES IN DECIMALS OF A DEGREE, AND LENGTH OF A ONE-DEGREE CURVE.

Minutes	Decimals of a Degree	Length of a 1° Curve	Minutes	Decimals of a Degree	Length of a 1° Curve	Minutes	Decimals of a 1° Curve	Length of a 1° Curve
0	.0000	0.00	20	.3333	33.33	40	.6667	66.67
1	.0167	1.67	21	.3500	35.00	41	.6833	68.33
2	.0333	3.33	22	.3667	36.67	42	.7000	70.00
3	.0500	5.00	23	.3833	38.33	43	.7167	71.67
4	.0667	6.67	24	.4000	40.00	44	.7333	73.33
5	.0833	8.33	25	.4167	41.67	45	.7500	75.00
6	.1000	10.00	26	.4333	43.33	46	.7667	76.67
7	.1167	11.67	27	.4500	45.00	47	.7833	78.33
8	.1333	13.33	28	.4667	46.67	48	.8000	80.00
9	.1500	15.00	29	.4833	48.33	49	.8167	81.67
10	.1667	16.67	30	.5000	50.00	50	.8333	83.33
11	.1833	18.33	31	.5167	51.67	51	.8500	85.00
12	.2000	20.00	32	.5333	53.33	52	.8667	86.67
13	.2167	21.67	33	.5500	55.00	53	.8833	88.33
14	.2333	23.33	34	.5667	56.67	54	.9000	90.00
15	.2500	25.00	35	.5833	58.33	55	.9167	91.67
16	.2667	26.67	36	.6000	60.00	56	.9333	93.33
17	.2833	28.33	37	.6167	61.67	57	.9500	95.00
18	.3000	30.00	38	.6333	63.33	58	.9667	96.67
19	.3167	31.67	39	.6500	65.00	59	.9833	98.33

POSITIVE CORRECTION FOR LENGTH OF SUB-CHORD FOR A 10° CURVE.

Sub-chord	Correction
10'	.013
20	.024
30	.035
40	.043
50	.048
60	.049
70	.045
80	.037
90	.022

The correction varies as the square of the degree of curve. Thus for a 15° curve and sub-chord of 70' the correction $= \left(\frac{15}{10}\right)^2 \times .045 = .101'$

	0°						1°					
′	T	E	C	M	X	Y	T	E	C	M	X	Y
0	0.00	0.000	0.00	0.000	0.00	0.000	50.00	0.218	100.00	0.218	100.00	0.873
1	0.83	0.000	1.67	0.000	1.67	0.000	50.84	0.226	01.67	0.226	01.66	0.902
2	1.67	0.000	3.33	0.000	3.33	0.001	51.67	0.233	03.33	0.233	03.33	0.932
3	2.50	0.001	5.00	0.001	5.00	0.002	52.50	0.241	05.00	0.241	05.00	0.962
4	3.33	0.001	6.67	0.001	6.67	0.004	53.34	0.248	06.67	0.248	06.66	0.993
5	4.17	0.002	8.33	0.002	8.33	0.006	54.17	0.256	08.33	0.256	08.33	1.024
6	5.00	0.002	10.00	0.002	10.00	0.009	55.00	0.264	10.00	0.264	09.99	1.056
7	5.83	0.003	11.67	0.003	11.67	0.012	55.84	0.272	11.67	0.272	11.66	1.088
8	6.67	0.004	13.33	0.004	13.33	0.016	56.67	0.280	13.33	0.280	13.33	1.121
9	7.50	0.005	15.00	0.005	15.00	0.020	57.50	0.289	15.00	0.289	14.99	1.154
10	8.33	0.006	16.67	0.006	16.67	0.024	58.34	0.297	116.67	0.297	116.66	1.188
11	9.17	0.007	18.33	0.007	18.33	0.029	59.17	0.306	18.33	0.306	18.33	1.222
12	10.00	0.009	20.00	0.009	20.00	0.035	60.00	0.314	20.00	0.314	19.99	1.257
13	10.83	0.010	21.67	0.010	21.67	0.041	60.84	0.323	21.67	0.323	21.66	1.292
14	11.67	0.012	23.33	0.012	23.33	0.048	61.67	0.332	23.33	0.332	23.33	1.327
15	12.50	0.014	25.00	0.014	25.00	0.055	62.50	0.341	25.00	0.341	24.99	1.364
16	13.33	0.016	26.67	0.016	26.67	0.062	63.34	0.350	26.67	0.350	26.66	1.400
17	14.17	0.018	28.33	0.018	28.33	0.070	64.17	0.359	28.33	0.359	28.32	1.437
18	15.00	0.020	30.00	0.020	30.00	0.079	65.00	0.369	30.00	0.369	29.99	1.475
19	15.83	0.022	31.67	0.022	31.67	0.088	65.84	0.378	31.67	0.378	31.66	1.513
20	16.67	0.024	33.33	0.024	33.33	0.097	66.67	0.388	133.33	0.388	133.32	1.551
21	17.50	0.027	35.00	0.027	35.00	0.107	67.50	0.398	35.00	0.398	34.99	1.590
22	18.33	0.029	36.67	0.029	36.67	0.117	68.34	0.408	36.67	0.408	36.66	1.630
23	19.17	0.032	38.33	0.032	38.33	0.128	69.17	0.418	38.33	0.418	38.32	1.670
24	20.00	0.035	40.00	0.035	40.00	0.140	70.00	0.428	40.00	0.428	39.99	1.710
25	20.83	0.038	41.67	0.038	41.67	0.152	70.84	0.438	41.66	0.438	41.65	1.751
26	21.67	0.041	43.33	0.041	43.33	0.164	71.67	0.448	43.33	0.448	43.32	1.793
27	22.50	0.044	45.00	0.044	45.00	0.177	72.50	0.459	45.00	0.459	44.99	1.835
28	23.33	0.048	46.67	0.048	46.67	0.190	73.34	0.469	46.66	0.469	46.65	1.877
29	24.17	0.051	48.33	0.051	48.33	0.204	74.17	0.480	48.33	0.480	48.32	1.920
30	25.00	0.055	50.00	0.055	50.00	0.218	75.01	0.491	150.00	0.491	149.98	1.963
31	25.83	0.058	51.67	0.058	51.67	0.233	75.84	0.502	51.66	0.502	51.65	2.007
32	26.67	0.062	53.33	0.062	53.33	0.248	76.67	0.513	53.33	0.513	53.32	2.052
33	27.50	0.066	55.00	0.066	55.00	0.264	77.51	0.524	55.00	0.524	54.98	2.096
34	28.33	0.070	56.67	0.070	56.67	0.280	78.34	0.536	56.66	0.535	56.65	2.142
35	29.17	0.074	58.33	0.074	58.33	0.297	79.17	0.547	58.33	0.547	58.32	2.188
36	30.00	0.079	60.00	0.079	60.00	0.314	80.01	0.559	60.00	0.559	59.98	2.234
37	30.83	0.083	61.67	0.083	61.67	0.332	80.84	0.570	61.66	0.570	61.65	2.281
38	31.67	0.088	63.33	0.088	63.33	0.350	81.67	0.582	63.33	0.582	63.31	2.328
39	32.50	0.092	65.00	0.092	65.00	0.369	82.51	0.594	65.00	0.594	64.98	2.376
40	33.33	0.097	66.67	0.097	66.67	0.388	83.34	0.606	166.66	0.606	166.65	2.424
41	34.17	0.102	68.33	0.102	68.33	0.408	84.17	0.618	68.33	0.618	68.31	2.473
42	35.00	0.107	70.00	0.107	70.00	0.428	85.01	0.631	70.00	0.630	69.98	2.522
43	35.83	0.112	71.67	0.112	71.67	0.448	85.84	0.643	71.66	0.643	71.64	2.572
44	36.67	0.117	73.33	0.117	73.33	0.469	86.67	0.656	73.33	0.655	73.31	2.622
45	37.50	0.123	75.00	0.123	75.00	0.491	87.51	0.668	75.00	0.668	74.98	2.672
46	38.33	0.128	76.67	0.128	76.67	0.513	88.34	0.681	76.66	0.681	76.64	2.724
47	39.17	0.134	78.33	0.134	78.33	0.535	89.17	0.694	78.33	0.694	78.31	2.775
48	40.00	0.140	80.00	0.140	80.00	0.559	90.01	0.707	79.99	0.707	79.97	2.827
49	40.83	0.146	81.67	0.146	81.66	0.582	90.84	0.720	81.66	0.720	81.64	2.880
50	41.67	0.152	83.33	0.152	83.33	0.606	91.68	0.733	183.33	0.733	183.30	2.933
51	42.50	0.158	85.00	0.158	85.00	0.630	92.51	0.747	84.99	0.747	84.97	2.987
52	43.33	0.164	86.67	0.164	86.66	0.655	93.34	0.760	86.66	0.760	86.64	3.041
53	44.17	0.170	88.33	0.170	88.33	0.681	94.18	0.774	88.33	0.774	88.30	3.095
54	45.00	0.177	90.00	0.177	90.00	0.707	95.01	0.788	89.99	0.788	89.97	3.150
55	45.83	0.183	91.67	0.183	91.66	0.733	95.84	0.802	91.66	0.802	91.63	3.206
56	46.67	0.190	93.33	0.190	93.33	0.760	96.68	0.816	93.33	0.816	93.30	3.262
57	47.50	0.197	95.00	0.197	95.00	0.788	97.51	0.830	94.99	0.830	94.96	3.318
58	48.34	0.204	96.67	0.204	96.66	0.816	98.34	0.844	96.66	0.844	96.63	3.375
59	49.17	0.211	98.33	0.211	98.33	0.844	99.18	0.858	98.33	0.858	98.30	3.432

2°						3°						
T	E	C	M	X	Y	T	E	C	M	X	Y	′
100.01	0.873	199.99	0.873	199.96	3.490	150.04	1.964	299.97	1.963	299.87	7.852	0
00.85	0.887	201.66	0.887	201.63	3.549	50.87	1.986	30/64	1.985	301.53	7.940	1
01.68	0.902	03.33	0.902	03.29	3.608	51.70	2.008	03.30	2.007	03.20	8.028	2
02.51	0.917	04.99	0.917	04.96	3.667	52.54	2.030	04.97	2.029	04.86	8.116	3
03.35	0.932	06.66	0.932	06.62	3.727	53.37	2.052	06.63	2.052	06.52	8.205	4
04.18	0.947	08.32	0.947	08.29	3.787	54.21	2.075	08.30	2.074	08.19	8.294	5
05.01	0.962	09.99	0.962	09.96	3.848	55.04	2.097	09.97	2.096	09.85	8.384	6
05.85	0.978	11.66	0.977	11.62	3.909	55.87	2.120	11.63	2.119	11.52	8.475	7
06.68	0.993	13.32	0.993	13.29	3.971	56.71	2.143	13.30	2.142	13.18	8.566	8
07.51	1.009	14.99	1.009	14.95	4.033	57.54	2.166	14.96	2.165	14.85	8.657	9
108.35	1.024	216.66	1.024	216.62	4.096	158.38	2.189	316.63	2.188	316.51	8.749	10
09.18	1.040	18.32	1.040	18.28	4.159	59.21	2.212	18.30	2.211	18.17	8.841	11
10.01	1.056	19.99	1.056	19.95	4.223	60.04	2.235	19.96	2.234	19.84	8.934	12
10.85	1.072	21.66	1.072	21.61	4.287	60.88	2.258	21.63	2.257	21.50	9.027	13
11.68	1.088	23.32	1.088	23.28	4.352	61.71	2.282	23.29	2.281	23.17	9.121	14
12.52	1.105	24.99	1.104	24.95	4.417	62.55	2.305	24.96	2.304	24.83	9.215	15
13.35	1.121	26.65	1.121	26.61	4.483	63.38	2.329	26.63	2.328	26.49	9.310	16
14.18	1.138	28.32	1.137	28.28	4.549	64.21	2.353	28.29	2.352	28.16	9.405	17
15.02	1.154	29.99	1.154	29.94	4.616	65.05	2.377	29.96	2.376	29.82	9.501	18
15.85	1.171	31.65	1.171	31.61	4.683	65.88	2.401	31.62	2.400	31.49	9.597	19
116.68	1.188	232.32	1.188	233.27	4.751	166.72	2.425	333.29	2.424	333.15	9.694	20
17.52	1.205	34.99	1.205	34.94	4.819	67.55	2.449	34.96	2.448	34.81	9.791	21
18.35	1.222	36.65	1.222	36.60	4.887	68.38	2.474	36.62	2.473	36.48	9.888	22
19.19	1.240	38.32	1.239	38.27	4.956	69.22	2.498	38.29	2.497	38.14	9.987	23
20.02	1.257	39.99	1.257	39.93	5.026	70.05	2.523	39.95	2.522	39.80	10.09	24
20.85	1.274	41.65	1.274	41.60	5.096	70.89	2.548	41.62	2.547	41.47	10.18	25
21.69	1.292	43.32	1.292	43.26	5.166	71.72	2.573	43.29	2.572	43.13	10.28	26
22.52	1.310	44.98	1.310	44.93	5.237	72.55	2.598	44.95	2.597	44.80	10.38	27
23.35	1.328	46.65	1.327	46.59	5.309	73.39	2.623	46.62	2.622	46.46	10.48	28
24.19	1.346	48.32	1.345	48.26	5.381	74.22	2.648	48.28	2.647	48.12	10.59	29
125.02	1.364	249.98	1.364	249.92	5.453	175.06	2.674	349.95	2.672	349.79	10.69	30
25.86	1.382	51.65	1.382	51.59	5.526	75.89	2.699	51.62	2.698	51.45	10.79	31
26.69	1.400	53.32	1.400	53.25	5.600	76.72	2.725	53.28	2.724	53.11	10.89	32
27.52	1.419	54.98	1.419	54.92	5.674	77.56	2.751	54.95	2.749	54.78	10.99	33
28.36	1.438	56.65	1.437	56.58	5.748	78.39	2.776	56.61	2.775	56.44	11.10	34
29.19	1.456	58.31	1.456	58.25	5.823	79.23	2.803	58.28	2.801	58.10	11.20	35
30.02	1.475	59.98	1.475	59.91	5.898	80.06	2.829	59.95	2.827	59.77	11.31	36
30.86	1.494	61.65	1.494	61.58	5.974	80.90	2.855	61.61	2.854	61.43	11.41	37
31.69	1.513	63.31	1.513	63.24	6.050	81.73	2.881	63.28	2.880	63.09	11.52	38
32.53	1.532	64.98	1.532	64.91	6.127	82.56	2.908	64.94	2.906	64.76	11.62	39
133.36	1.552	266.65	1.551	266.57	6.205	183.40	2.934	366.61	2.933	366.42	11.73	40
34.19	1.571	68.31	1.571	68.24	6.282	84.23	2.961	68.27	2.960	68.08	11.84	41
35.03	1.591	69.98	1.590	69.90	6.361	85.07	2.988	69.94	2.987	69.75	11.94	42
35.86	1.611	71.64	1.610	71.57	6.439	85.90	3.015	71.61	3.014	71.41	12.05	43
36.69	1.630	73.31	1.630	73.23	6.519	86.74	3.042	73.27	3.041	73.07	12.16	44
37.53	1.650	74.98	1.650	74.90	6.598	87.57	3.069	74.94	3.068	74.74	12.27	45
38.36	1.670	76.64	1.670	76.56	6.679	88.40	3.097	76.60	3.095	76.40	12.38	46
39.19	1.691	78.31	1.690	78.23	6.759	89.24	3.124	78.27	3.123	78.06	12.49	47
40.03	1.711	79.98	1.710	79.89	6.840	90.07	3.152	79.94	3.150	79.73	12.60	48
40.86	1.731	81.64	1.731	81.56	6.922	90.91	3.180	81.60	3.178	81.39	12.71	49
141.70	1.752	283.31	1.751	283.22	7.004	191.74	3.207	383.27	3.206	383.05	12.82	50
42.53	1.773	84.97	1.772	84.89	7.087	92.58	3.235	84.93	3.234	84.72	12.93	51
43.37	1.793	86.64	1.793	86.55	7.170	93.41	3.263	86.60	3.262	86.38	13.04	52
44.20	1.814	88.31	1.814	88.22	7.254	94.24	3.292	88.26	3.290	88.04	13.16	53
45.03	1.835	89.97	1.835	89.88	7.338	95.08	3.320	89.93	3.318	89.70	13.27	54
45.87	1.857	91.64	1.856	91.54	7.422	95.91	3.348	91.60	3.347	91.37	13.38	55
46.70	1.878	93.31	1.877	93.21	7.507	96.75	3.377	93.26	3.375	93.03	13.50	56
47.53	1.899	94.97	1.899	94.87	7.593	97.58	3.406	94.93	3.404	94.69	13.61	57
48.37	1.921	96.64	1.920	96.54	7.679	98.42	3.434	96.59	3.432	96.35	13.73	58
49.20	1.942	98.30	1.942	98.20	7.765	99.25	3.463	98.26	3.461	98.02	13.84	59

	4°						5°					
/	T	E	C	M	X	Y	T	E	C	M	X	Y
0	200.08	3.492	399.92	3.490	399.68	13.96	250.16	5.459	499.85	5.453	499.37	21.80
1	00.92	3.522	401.59	3.520	401.34	14.07	51.00	5.495	501.51	5.490	501.03	21.95
2	01.75	3.551	03.26	3.549	03.01	14.19	51.83	5.532	03.18	5.526	02.69	22.09
3	02.59	3.580	04.92	3.578	04.67	14.31	52.67	5.568	04.84	5.563	04.35	22.24
4	03.42	3.610	06.59	3.608	06.33	14.43	53.50	5.605	06.51	5.600	06.01	22.39
5	04.26	3.640	08.25	3.637	07.99	14.54	54.34	5.642	08.17	5.637	07.67	22.54
6	05.09	3.669	09.92	3.667	09.66	14.66	55.17	5.679	09.84	5.674	09.33	22.68
7	05.92	3.699	11.58	3.697	11.32	14.78	56.01	5.717	11.50	5.711	10.99	22.83
8	06.76	3.729	13.25	3.727	12.98	14.90	56.84	5.754	13.17	5.748	12.65	22.98
9	07.59	3.760	14.91	3.757	14.64	15.02	57.68	5.791	14.83	5.785	14.31	23.13
10	208.43	3.790	416.58	3.787	416.30	15.14	258.51	5.829	516.50	5.823	515.97	23.28
11	09.26	3.820	18.25	3.818	17.97	15.27	59.35	5.867	18.16	5.861	17.63	23.43
12	10.10	3.851	19.91	3.848	19.63	15.39	60.18	5.904	19.83	5.898	19.29	23.58
13	10.93	3.881	21.58	3.879	21.29	15.51	61.02	5.942	21.49	5.936	20.95	23.73
14	11.77	3.912	23.24	3.909	22.95	15.63	61.85	5.980	23.16	5.974	22.61	23.88
15	12.60	3.943	24.91	3.940	24.62	15.76	62.69	6.019	24.83	6.012	24.27	24.04
16	13.43	3.974	26.57	3.971	26.28	15.88	63.52	6.057	26.49	6.050	25.93	24.19
17	14.27	4.005	28.24	4.002	27.94	16.00	64.36	6.095	28.15	6.089	27.59	24.34
18	15.10	4.036	29.90	4.033	29.60	16.13	65.19	6.134	29.82	6.127	29.25	24.50
19	15.94	4.068	31.57	4.065	31.26	16.25	66.03	6.173	31.48	6.166	30.91	24.65
20	216.77	4.099	433.24	4.096	432.93	16.38	266.86	6.211	533.15	6.205	532.57	24.80
21	17.61	4.131	34.90	4.128	34.59	16.51	67.70	6.250	34.81	6.243	34.23	24.96
22	18.44	4.163	36.57	4.159	36.25	16.63	68.53	6.289	36.48	6.282	35.89	25.12
23	19.28	4.194	38.23	4.191	37.91	16.76	69.37	6.328	38.14	6.321	37.55	25.27
24	20.11	4.226	39.90	4.223	39.57	16.89	70.20	6.368	39.81	6.361	39.21	25.43
25	20.95	4.259	41.56	4.255	41.23	17.01	71.04	6.407	41.47	6.400	40.87	25.59
26	21.78	4.291	43.23	4.287	42.90	17.14	71.87	6.447	43.14	6.439	42.53	25.74
27	22.61	4.323	44.89	4.320	44.56	17.27	72.71	6.486	44.80	6.479	44.19	25.90
28	23.45	4.355	46.56	4.352	46.22	17.40	73.54	6.526	46.47	6.519	45.84	26.06
29	24.28	4.388	48.22	4.385	47.88	17.53	74.38	6.566	48.13	6.558	47.50	26.22
30	225.12	4.421	449.89	4.417	449.54	17.66	275.21	6.606	549.80	6.598	549.16	26.38
31	25.95	4.454	51.56	4.450	51.20	17.79	76.05	6.646	51.46	6.638	50.82	26.54
32	26.79	4.487	53.22	4.483	52.87	17.93	76.89	6.686	53.13	6.679	52.48	26.70
33	27.62	4.520	54.89	4.516	54.53	18.06	77.72	6.727	54.79	6.719	54.14	26.86
34	28.46	4.553	56.55	4.549	56.19	18.19	78.56	6.767	56.45	6.759	55.80	27.02
35	29.29	4.586	58.22	4.583	57.85	18.32	79.39	6.808	58.12	6.800	57.46	27.18
36	30.13	4.620	59.88	4.616	59.51	18.46	80.23	6.849	59.78	6.840	59.12	27.35
37	30.96	4.653	61.55	4.649	61.17	18.59	81.06	6.890	61.45	6.881	60.77	27.51
38	31.80	4.687	63.21	4.683	62.83	18.72	81.90	6.930	63.11	6.922	62.43	27.67
39	32.63	4.721	64.88	4.717	64.50	18.86	82.73	6.972	64.78	6.963	64.09	27.84
40	233.47	4.755	466.54	4.751	466.16	18.99	283.57	7.013	566.44	7.004	565.75	28.00
41	34.30	4.789	68.21	4.785	67.82	19.13	84.40	7.054	68.11	7.046	67.41	28.16
42	35.13	4.823	69.87	4.819	69.48	19.27	85.24	7.096	69.77	7.087	69.07	28.33
43	35.97	4.857	71.54	4.853	71.14	19.40	86.07	7.137	71.44	7.128	70.73	28.50
44	36.80	4.891	73.20	4.887	72.80	19.54	86.91	7.179	73.10	7.170	72.38	28.66
45	37.64	4.926	74.87	4.922	74.46	19.68	87.74	7.221	74.77	7.212	74.04	28.83
46	38.47	4.961	76.54	4.956	76.12	19.82	88.58	7.263	76.43	7.254	75.70	29.00
47	39.31	4.995	78.20	4.991	77.78	19.96	89.42	7.305	78.10	7.296	77.36	29.16
48	40.14	5.030	79.86	5.026	79.44	20.09	90.25	7.347	79.76	7.338	79.02	29.33
49	40.98	5.065	81.53	5.061	81.11	20.23	91.09	7.389	81.42	7.380	80.68	29.50
50	241.81	5.100	483.20	5.096	482.77	20.37	291.92	7.432	583.09	7.422	582.33	29.67
51	42.65	5.136	84.86	5.131	84.43	20.52	92.76	7.474	84.75	7.465	83.99	29.84
52	43.48	5.171	86.53	5.166	86.09	20.66	93.59	7.517	86.42	7.507	85.65	30.01
53	44.32	5.207	88.19	5.202	87.75	20.80	94.43	7.560	88.08	7.550	87.31	30.18
54	45.15	5.242	89.86	5.237	89.41	20.94	95.26	7.603	89.75	7.593	88.97	30.35
55	45.99	5.278	91.52	5.273	91.07	21.08	96.10	7.646	91.41	7.636	90.62	30.52
56	46.82	5.314	93.19	5.309	92.73	21.23	96.94	7.689	93.08	7.679	92.28	30.69
57	47.66	5.350	94.85	5.345	94.39	21.37	97.77	7.732	94.74	7.722	93.94	30.87
58	48.49	5.386	96.52	5.381	96.05	21.51	98.61	7.776	96.40	7.765	95.60	31.04
59	49.33	5.422	98.18	5.417	97.71	21.66	99.44	7.819	98.07	7.809	97.25	31.21

6°						7°						
T	E	C	M	X	Y	T	E	C	M	X	Y	I
300.28	7.863	599.71	7.852	598.91	31.39	350.44	10.71	699.57	10.69	698.27	42.71	0
01.11	7.907	601.40	7.896	600.57	31.56	51.28	10.76	701.24	10.74	99.92	42.91	1
01.95	7.951	03.06	7.940	02.23	31.74	52.11	10.81	02.90	10.79	701.58	43.12	2
02.79	7.995	04.73	7.984	03.88	31.91	52.95	10.86	04.56	10.84	03.23	43.32	3
03.62	8.039	06.39	8.028	05.54	32.09	53.79	10.91	06.23	10.89	04.89	43.52	4
04.46	8.083	08.06	8.072	07.20	32.26	54.62	10.96	07.89	10.94	06.54	43.73	5
05.29	8.128	09.72	8.116	08.86	32.44	55.46	11.02	09.55	10.99	08.19	43.94	6
06.13	8.172	11.38	8.161	10.51	32.62	56.30	11.07	11.22	11.05	09.85	44.14	7
06.96	8.217	13.05	8.205	12.17	32.80	57.13	11.12	12.88	11.10	11.50	44.35	8
07.80	8.262	14.71	8.250	13.83	32.98	57.97	11.17	14.55	11.15	13.15	44.56	9
308.64	8.307	616.38	8.294	615.48	33.15	358.81	11.22	716.21	11.20	14.81	44.76	10
09.47	8.352	18.04	8.339	17.14	33.33	59.64	11.28	17.87	11.25	16.46	44.97	11
10.31	8.397	19.71	8.384	18.80	33.51	60.48	11.33	19.54	11.31	18.12	45.18	12
11.14	8.442	21.37	8.430	20.46	33.69	61.32	11.38	21.20	11.36	19.77	45.39	13
11.98	8.487	23.03	8.475	22.11	33.87	62.15	11.43	22.86	11.41	21.42	45.60	14
12.81	8.533	24.70	8.520	23.77	34.06	62.99	11.49	24.53	11.46	23.08	45.81	15
13.65	8.578	26.36	8.566	25.43	34.24	63.83	11.54	26.19	11.52	24.73	46.02	16
14.49	8.624	28.03	8.611	27.08	34.42	64.66	11.59	27.85	11.57	26.38	46.23	17
15.32	8.670	29.69	8.657	28.74	34.60	65.50	11.65	29.52	11.62	28.04	46.44	18
16.16	8.716	31.35	8 703	30.40	34.78	66.34	11.70	31.18	11.68	29.69	46.65	19
316.99	8.762	633.02	8.749	632.05	34.97	367.17	11.75	732.84	11.73	731.34	46.87	20
17.83	8.808	34.68	8.795	33.71	35.15	68.01	11.81	34.51	11.78	33.00	47.08	21
18.67	8.855	36.35	8.841	35.37	35.34	68.85	11.86	36.17	11.84	34.65	47.29	22
19.50	8.901	38.01	8.887	37.02	35.52	69.68	11 91	37.83	11.89	36.30	47.51	23
20.34	8.948	39.68	8.934	38.68	35.71	70.52	11.97	39.50	11.94	37.95	47.72	24
21.17	8.995	41.34	8.981	40.33	35.89	71.36	12.02	41.16	12.00	39.61	47.94	25
22.01	9.041	43.00	9.027	41.99	36.08	72.19	12.08	42.82	12.05	41.26	48.15	26
22.85	9.088	44.67	9.074	43.65	36.27	73.03	12.13	44.48	12.10	42.91	48.37	27
23.68	9.135	46.33	9.121	45.30	36.45	73.87	12.18	46.15	12.16	44.56	48.58	28
24.52	9.183	48.00	9.168	46.96	36.64	74.70	12.24	47.81	12.21	46.22	48.80	29
325.35	9.230	649.66	9.215	648.62	36.83	375.54	12.29	749.47	12.27	747.87	49.02	30
26.19	9.278	51.32	9.263	50.27	37.02	76.38	12.35	51.14	12.32	49.52	49.24	31
27.03	9.325	52.99	9.310	51.93	37.21	77.21	12.40	52.80	12.38	51.17	49.45	32
27.86	9.373	54.65	9.358	53.58	37.40	78.05	12.46	54.46	12.43	52.83	49.67	33
28.70	9.421	56.32	9.405	55.24	37.59	78.89	12.51	56.13	12.49	54.48	49.89	34
29.53	9.469	57.98	9.453	56.89	37.78	79.73	12.57	57.79	12.54	56.13	50.11	35
30.37	9.517	59.64	9.501	58.55	37.97	80.56	12.62	59.45	12.60	57.78	50.33	36
31.21	9.565	61.31	9.549	60.21	38.16	81.40	12.68	61.12	12.65	59.43	50.55	37
32.04	9.613	62.97	9.597	61.86	38.36	82.24	12.74	62.78	12.71	61.09	50.77	38
32.88	9.662	64.64	9.645	63.52	38.55	83.07	12.79	64.44	12.76	62.74	51.00	39
333.71	9.710	666.30	9.694	665.17	38.74	383.91	12.85	766.10	12.82	764.39	51.22	40
34.55	9.759	67.96	9.742	66.83	38.94	84.75	12.90	67.77	12.87	66.04	51.44	41
35.39	9.808	69.63	9.791	68.48	39.13	85.59	12.96	69.43	12.93	67.69	51.66	42
36.22	9.857	71.29	9.840	70.14	39.32	86.42	13.02	71.09	12.99	69.35	51.89	43
37.06	9.906	72.95	9.888	71.79	39.52	87.26	13.07	72.76	13.04	71.00	52.11	44
37.90	9.955	74.62	9.938	73.45	39.72	88.10	13.13	74.42	13.10	72.65	52.34	45
38.73	10.00	76.28	9.987	75.10	39.91	88.93	13.19	76.08	13.16	74.30	52.56	46
39.57	10.05	77.95	10.04	76.76	40.11	89.77	13.24	77.74	13.21	75.95	52.79	47
40.40	10.10	79.61	10.09	78.41	40.31	90.61	13.30	79.41	13.27	77.60	53.01	48
41.24	10.15	81.27	10.13	80.07	40.50	91.45	13.36	81.07	13.33	79.25	53.24	49
342.08	10.20	682.94	10.18	681.72	40.70	392.28	13.41	782.83	13.38	780.91	53.46	50
42.91	10.25	84.60	10.23	83.38	40.90	93.12	13.47	84.40	13.44	82.56	53.69	51
43.75	10.30	86.26	10.28	85.03	41.10	93.96	13.53	86.06	13.50	84.21	53.92	52
44.59	10.35	87.93	10.33	86.69	41.30	94.79	13.59	87.72	13.55	85.86	54.15	53
45.42	10.40	89.59	10.38	88.34	41.50	95.63	13.64	89.38	13.61	87.51	54.38	54
46.26	10.45	91.26	10.43	90.00	41.70	96.47	13.70	91.05	13.67	89.16	54.61	55
47.09	10.50	92.92	10.48	91.65	41.90	97.31	13.76	92.71	13.73	90.81	54.84	56
47.93	10.55	94.58	10.53	93.31	42.10	98.14	13.82	94.37	13.78	92.46	55.07	57
48.77	10.61	96.25	10.59	94.96	42.30	98.98	13.87	96.04	13.84	94.11	55.30	58
49.60	10.66	97.91	10.64	96.62	42.51	99.82	13.93	97.70	13.90	95.76	55.53	59

	8°						9°					
I	T	E	C	M	X	Y	T	E	C	M	X	Y
0	400.66	13.99	799.36	13.96	797.41	55.76	450.93	17.72	899.09	17.66	896.31	70.54
1	01.49	14.05	801.02	14.02	99.06	55.99	51.77	17.78	900.75	17.73	97.96	70.80
2	02.33	14.11	02.69	14.07	800.71	56.23	52.61	17.85	02.41	17.79	99.61	71.06
3	03.17	14.17	04.35	14.13	02.36	56.46	53.45	17.92	04.07	17.86	901.25	71.33
4	04.01	14.23	06.01	14.19	04.01	56.69	54.29	17.98	05.73	17.93	02.90	71.59
5	04.84	14.28	07.67	14.25	05.66	56.93	55.13	18.05	07.39	17.99	04.54	71.85
6	05.68	14.34	09.34	14.31	07.31	57.16	55.96	18.11	09.06	18.06	06.19	72.11
7	06.52	14.40	11.00	14.37	08.96	57.40	56.80	18.18	10.72	18.12	07.84	72.38
8	07.36	14.46	12.66	14.43	10.61	57.63	57.64	18.25	12.38	18.19	09.48	72.64
9	08.19	14.52	14.32	14.49	12.26	57.87	58.48	18.31	14.04	18.26	11.13	72.91
10	409.03	14.58	815.99	14.54	813.91	58.10	459.32	18.38	915.70	18.32	912.77	73.17
11	09.87	14.64	17.65	14.60	15.56	58.34	60.16	18.45	17.36	18.39	14.42	73.44
12	10.71	14.70	19.31	14.66	17.21	58.58	61.00	18.52	19.02	18.46	16.06	73.70
13	11.54	14.76	20.97	14.72	18.86	58.82	61.84	18.58	20.68	18.52	17.71	73.97
14	12.38	14.82	22.64	14.78	20.51	59.06	62.67	18.65	22.35	18.59	19.35	74.24
15	13.22	14.88	24.30	14.84	22.16	59.29	63.51	18.72	24.01	18.66	21.00	74.51
16	14.06	14.94	25.96	14.90	23.81	59.53	64.35	18.79	25.67	18.72	22.64	74.77
17	14.89	15.00	27.62	14.96	25.46	59.77	65.19	18.85	27.33	18.79	24.29	75.04
18	15.73	15.06	29.29	15.02	27.11	60.01	66.03	18.92	28.99	18.86	25.93	75.31
19	16.57	15.12	30.95	15.08	28.76	60.25	66.87	18.99	30.65	18.93	27.58	75.58
20	417.41	15.18	832.61	15.14	830.41	60.50	467.71	19.06	932.31	18.99	929.22	75.85
21	18.25	15.25	34.27	15.20	32.06	60.74	68.55	19.13	33.97	19.06	30.87	76.12
22	19.08	15.31	35.93	15.27	33.71	60.98	69.39	19.19	35.63	19.13	32.51	76.39
23	19.92	15.37	37.60	15.33	35.36	61.22	70.22	19.26	37.30	19.20	34.16	76.66
24	20.76	15.43	39.26	15.39	37.00	61.47	71.06	19.33	38.96	19.27	35.80	76.94
25	21.60	15.49	40.92	15.45	38.65	61.71	71.90	19.40	40.62	19.33	37.44	77.21
26	22.43	15.55	42.58	15.51	40.30	61.95	72.74	19.47	42.28	19.40	39.09	77.48
27	23.27	15.61	44.24	15.57	41.95	62.20	73.58	19.54	43.94	19.47	40.73	77.76
28	24.11	15.67	45.91	15.63	43.60	62.44	74.42	19.61	45.60	19.54	42.38	78.03
29	24.95	15.74	47.57	15.69	45.25	62.69	75.26	19.68	47.26	19.61	44.02	78.30
30	425.79	15.80	849.23	15.76	846.90	62.94	476.10	19.75	948.92	19.68	945.67	78.58
31	26.62	15.86	50.89	15.82	48.54	63.18	76.94	19.82	50.59	19.75	47.31	78.86
32	27.46	15.92	52.56	15.88	50.19	63.43	77.78	19.89	52.25	19.82	48.95	79.13
33	28.30	15.99	54.22	15.94	51.84	63.68	78.61	19.96	53.91	19.89	50.60	79.41
34	29.14	16.05	55.88	16.00	53.49	63.92	79.45	20.03	55.57	19.96	52.24	79.68
35	29.98	16.11	57.54	16.07	55.14	64.17	80.29	20.10	57.23	20.03	53.88	79.96
36	30.81	16.17	59.20	16.13	56.79	64.42	81.13	20.17	58.89	20.09	55.53	80.24
37	31.65	16.24	60.87	16.19	58.43	64.67	81.97	20.24	60.55	20.16	57.17	80.52
38	32.49	16.30	62.53	16.25	60.08	64.92	82.81	20.31	62.21	20.23	58.81	80.79
39	33.33	16.36	64.19	16.32	61.73	65.17	83.65	20.38	63.87	20.30	60.46	81.07
40	434.17	16.43	865.85	16.38	863.38	65.42	484.49	20.45	965.53	20.37	962.10	81.35
41	35.01	16.49	67.51	16.44	65.02	65.67	85.33	20.52	67.19	20.44	63.74	81.63
42	35.84	16.55	69.18	16.51	66.67	65.93	86.17	20.59	68.85	20.52	65.39	81.91
43	36.68	16.62	70.84	16.57	68.32	66.18	87.01	20.66	70.51	20.59	67.03	82.20
44	37.52	16.68	72.50	16.63	69.97	66.43	87.85	20.73	72.18	20.66	68.67	82.48
45	38.36	16.74	74.16	16.70	71.61	66.68	88.69	20.80	73.84	20.73	70.31	82.76
46	39.20	16.81	75.82	16.76	73.26	66.94	89.53	20.87	75.50	20.80	71.96	83.04
47	40.03	16.87	77.48	16.82	74.91	67.19	90.36	20.95	77.16	20.87	73.60	83.32
48	40.87	16.94	79.15	16.89	76.56	67.45	91.20	21.02	78.82	20.94	75.24	83.61
49	41.71	17.00	80.81	16.95	78.20	67.70	92.04	21.09	80.48	21.01	76.88	83.89
50	442.55	17.07	882.47	17.01	879.85	67.96	492.88	21.16	982.14	21.08	978.53	84.18
51	43.39	17.13	84.13	17.08	81.50	68.21	93.72	21.23	83.80	21.15	80.17	84.46
52	44.23	17.19	85.79	17.14	83.14	68.47	94.56	21.30	85.46	21.23	81.81	84.75
53	45.06	17.26	87.46	17.21	84.79	68.73	95.40	21.38	87.12	21.30	83.45	85.03
54	45.90	17.32	89.12	17.27	86.44	68.99	96.24	21.45	88.78	21.37	85.09	85.32
55	46.74	17.39	90.78	17.34	88.08	69.24	97.08	21.52	90.44	21.44	86.74	85.61
56	47.58	17.46	92.44	17.40	89.73	69.50	97.92	21.59	92.10	21.51	88.38	85.89
57	48.42	17.52	94.10	17.47	91.38	69.76	98.76	21.67	93.76	21.59	90.02	86.18
58	49.26	17.59	95.76	17.53	93.02	70.02	99.60	21.74	95.42	21.66	91.66	86.47
59	50.09	17.65	97.42	17.60	94.67	70.28	500.44	21.81	97.08	21.73	93.30	86.76

10°						11°						
T	E	C	M	X	Y	T	E	C	M	X	Y	/
501.28	21.89	998.74	21.80	994.94	87.05	551.70	26.50	1098.3	26.38	1093.3	105.27	0
02.12	21.96	1000.4	21.88	96.58	87.34	52.54	26.58	1100.0	26.46	94.9	05.59	1
02.96	22.03	02.1	21.95	98.23	87.63	53.38	26.66	01.6	26.54	96.5	05.91	2
03.80	22.11	03.7	22.02	99.87	87.92	54.23	26.74	03.3	26.62	98.2	06.23	3
04.64	22.18	05.4	22.09	1001.5	88.21	55.07	26.82	05.0	26.70	99.8	06.55	4
05.48	22.25	07.1	22.17	03.1	88.50	55.91	26.90	06.6	26.78	1101.4	06.87	5
06.32	22.33	08.7	22.24	04.8	88.79	56.75	26.99	08.3	26.86	03.1	07.19	6
07.16	22.40	10.4	22.31	06.4	89.08	57.59	27.05	09.9	26.94	04.7	07.51	7
08.00	22.48	12.0	22.39	08.1	89.38	58.43	27.15	11.6	27.02	06.4	07.83	8
08.84	22.55	13.7	22.46	09.7	89.67	59.27	27.23	13.3	27.10	08.0	08.15	9
509.68	22.62	1015.3	22.54	1011.4	89.96	560.11	27.31	1114.9	27.18	1109.6	108.47	10
10.52	22.70	17.0	22.61	13.0	90.26	60.96	27.39	16.6	27.26	11.3	08.80	11
11.36	22.77	18.7	22.68	14.6	90.55	61.80	27.48	18.2	27.35	12.9	09.12	12
12.20	22.85	20.3	22.76	16.3	90.85	62.64	27.56	19.9	27.43	14.5	09.44	13
13.04	22.92	22.0	22.83	17.9	91.14	63.48	27.64	21.5	27.51	16.2	09.77	14
13.88	23.00	23.6	22.91	19.6	91.44	64.32	27.72	23.2	27.59	17.8	10.09	15
14.72	23.07	25.3	22.98	21.2	91.74	65.16	27.81	24.9	27.67	19.4	10.42	16
15.56	23.15	27.0	23.06	22.8	92.04	66.00	27.89	26.5	27.75	21.1	10.74	17
16.40	23.22	28.6	23.13	24.5	92.33	66.85	27.97	28.2	27.84	22.7	11.07	18
17.24	23.30	30.3	23.20	26.1	92.63	67.69	28.05	29.8	27.92	24.3	11.40	19
518.08	23.37	1031.9	23.28	1027.8	92.93	568.53	28.14	1131.5	28.00	1126.0	111.73	20
18.92	23.45	33.6	23.35	29.4	93.23	69.37	28.22	33.2	28.08	27.6	12.05	21
19.76	23.53	35.3	23.43	31.0	93.53	70.21	28.30	34.8	28.16	29.2	12.38	22
20.60	23.60	36.9	23.51	32.7	93.83	71.05	28.39	36.5	28.25	30.9	12.71	23
21.44	23.68	38.6	23.58	34.3	94.13	71.90	28.47	38.1	28.33	32.5	13.04	24
22.28	23.75	40.2	23.66	36.0	94.43	72.74	28.55	39.8	28.41	34.1	13.37	25
23.12	23.83	41.9	23.73	37.6	94.73	73.58	28.64	41.5	28.50	35.8	13.70	26
23.96	23.91	43.6	23.81	39.2	95.03	74.42	28.72	43.1	28.58	37.4	14.03	27
24.80	23.98	45.2	23.88	40.9	95.34	75.26	28.81	44.8	28.66	39.0	14.36	28
25.64	24.06	46.9	23.96	42.5	95.64	76.10	28.89	46.4	28.75	40.7	14.69	29
526.48	24.14	1048.5	24.04	1044.1	95.94	576.95	28.97	1148.1	28.83	1142.3	115.02	30
27.32	24.21	50.2	24.11	45.8	96.25	77.79	29.06	49.7	28.91	43.9	15.36	31
28.16	24.29	51.9	24.19	47.4	96.55	78.63	29.14	51.4	29.00	45.6	15.69	32
29.00	24.37	53.5	24.27	49.1	96.86	79.47	29.23	53.1	29.08	47.2	16.02	33
29.84	24.45	55.2	24.34	50.7	97.16	80.31	29.31	54.7	29.16	48.8	16.36	34
30.68	24.52	56.8	24.42	52.3	97.47	81.15	29.40	56.4	29.25	50.5	16.69	35
31.52	24.60	58.5	24.50	54.0	97.77	82.00	29.48	58.0	29.33	52.1	17.03	36
32.36	24.68	60.2	24.57	55.6	98.08	82.84	29.57	59.7	29.42	53.7	17.36	37
33.20	24.76	61.8	24.65	57.3	98.39	83.68	29.65	61.3	29.50	55.4	17.70	38
34.05	24.83	63.5	24.73	58.9	98.70	84.52	29.74	63.0	29.58	57.0	18.03	39
534.89	24.91	1065.1	24.80	1060.5	99.00	585.36	29.82	1164.7	29.67	1158.6	18.37	40
35.73	24.99	66.8	24.88	62.2	99.31	86.21	29.91	66.3	29.75	60.3	18.71	41
36.57	25.07	68.5	24.96	63.8	99.62	87.05	30.00	68.0	29.84	61.9	19.05	42
37.41	25.15	70.1	25.04	65.4	99.93	87.89	30.08	69.6	29.92	63.5	19.38	43
38.25	25.23	71.8	25.12	67.1	100.24	88.73	30.17	71.3	30.01	65.2	19.72	44
39.09	25.30	73.4	25.19	68.7	00.55	89.58	30.25	73.0	30.09	66.8	20.06	45
39.93	25.38	75.1	25.27	70.4	00.86	90.42	30.34	74.6	30.18	68.4	20.40	46
40.77	25.46	76.8	25.35	72.0	01.18	91.26	30.43	76.3	30.27	70.1	20.74	47
41.61	25.54	78.4	25.43	73.6	01.49	92.10	30.51	77.9	30.35	71.7	21.08	48
42.45	25.62	80.1	25.51	75.3	01.80	92.94	30.60	79.6	30.44	73.3	21.42	49
543.29	25.70	1081.7	25.59	1076.9	102.11	593.79	30.69	1181.2	30.52	1175.0	21.77	50
44.13	25.78	83.4	25.66	78.5	02.43	94.63	30.77	82.9	30.61	76.6	22.11	51
44.97	25.86	85.1	25.74	80.2	02.74	95.47	30.86	84.6	30.69	78.2	22.45	52
45.82	25.94	86.7	25.82	81.8	03.06	96.31	30.95	86.2	30.78	79.8	22.79	53
46.66	26.02	88.4	25.90	83.5	03.37	97.16	31.03	87.9	30.87	81.5	23.14	54
47.50	26.10	90.0	25.98	85.1	03.69	98.00	31.12	89.5	30.95	83.1	23.48	55
48.34	26.18	91.7	26.06	86.7	04.00	98.84	31.21	91.2	31.04	84.7	23.82	56
49.18	26.26	93.3	26.14	88.4	04.32	99.68	31.30	92.9	31.13	86.4	24.17	57
50.02	26.34	95.0	26.22	90.0	04.63	600.53	31.38	94.5	31.21	88.0	24.52	58
50.86	26.42	96.7	26.30	91.6	04.95	01.37	31.47	96.2	31.30	89.6	24.86	59

	12°						13°					
I	T	E	C	M	X	Y	T	E	C	M	X	Y
0	602.21	31.56	1197.8	31.39	1191.3	125.21	652.81	37.07	1297.2	36.83	1288.9	146.85
1	03.05	31.65	99.5	31.47	92.9	25.55	53.66	37.16	98.9	36.93	90.5	47.23
2	03.90	31.74	1201.1	31.56	94.5	25.90	54.50	37.26	1300.5	37.02	92.1	47.60
3	04.74	31.83	02.8	31.65	96.2	26.25	55.34	37.36	02.2	37.11	93.8	47.98
4	05.58	31.91	04.5	31.74	97.8	26.60	56.19	37.45	03.9	37.21	95.4	48.35
5	06.42	32.00	06.1	31.82	99.4	26.95	57.03	37.55	05.5	37.30	97.0	48.73
6	07.27	32.09	07.8	31.91	1201.0	27.29	57.88	37.64	07.2	37.40	98.6	49.11
7	08.11	32.18	09.4	32.00	02.7	27.64	58.72	37.74	08.8	37.49	1300.3	49.49
8	08.95	32.27	11.1	32.09	04.3	27.99	59.57	37.84	10.5	37.59	01.9	49.86
9	09.79	32.36	12.7	32.18	05.9	28.34	60.41	37.93	12.1	37.68	03.5	50.24
10	610.64	32.45	1214.4	32.26	1207.6	128.70	661.25	38.03	1313.8	37.78	1305.1	150.62
11	11.48	32.54	16.1	32.35	09.2	29.05	62.10	38.13	15.4	37.88	06.7	51.00
12	12.32	32.63	17.7	32.44	10.8	29.40	62.94	38.23	17.1	37.97	08.4	51.38
13	13.17	32.72	19.4	32.53	12.4	29.76	63.79	38.32	18.8	38.07	10.0	51.76
14	14.01	32.81	21.0	32.62	14.1	30.10	64.63	38.42	20.4	38.16	11.6	52.15
15	14.85	32.90	22.7	32.71	15.7	30.46	65.48	38.52	22.1	38.26	13.2	52.53
16	15.69	32.99	24.3	32.80	17.3	30.81	66.32	38.61	23.7	38.36	14.9	52.91
17	16.54	33.08	26.0	32.89	19.0	31.17	67.17	38.71	25.4	38.45	16.5	53.29
18	17.38	33.17	27.7	32.98	20.6	31.52	68.01	38.81	27.0	38.55	18.1	53.68
19	18.22	33.26	29.3	33.06	22.2	31.88	68.86	38.91	28.7	38.65	19.7	54.06
20	619.07	33.35	1231.0	33.15	1223.8	132.23	669.70	39.01	1330.3	38.74	1321.3	154.44
21	19.91	33.44	32.6	33.24	25.5	32.59	70.54	39.10	32.0	38.84	23.0	54.83
22	20.75	33.53	34.3	33.33	27.1	32.94	71.39	39.20	33.7	38.94	24.6	55.21
23	21.60	33.62	35.9	33.42	28.7	33.30	72.23	39.30	35.3	39.03	26.2	55.60
24	22.44	33.71	37.6	33.51	30.4	33.66	73.08	39.40	37.0	39.13	27.8	55.98
25	23.28	33.80	39.3	33.60	32.0	34.02	73.92	39.50	38.6	39.23	29.5	56.37
26	24.13	33.89	40.9	33.69	33.6	34.38	74.77	39.60	40.3	39.32	31.1	56.76
27	24.97	33.98	42.6	33.78	35.2	34.74	75.61	39.70	41.9	39.42	32.7	57.15
28	25.81	34.08	44.2	33.87	36.9	35.10	76.46	39.79	43.6	39.52	34.3	57.53
29	26.66	34.17	45.9	33.96	38.5	35.46	77.30	39.89	45.2	39.62	35.9	57.92
30	627.50	34.26	1247.5	34.06	1240.1	135.82	678.15	39.99	1346.9	39.72	1337.6	158.31
31	28.34	34.35	49.2	34.15	41.8	36.18	78.99	40.09	48.6	39.81	39.2	58.70
32	29.19	34.44	50.9	34.24	43.4	36.54	79.84	40.19	50.2	39.91	40.8	59.09
33	30.03	34.53	52.5	34.33	45.0	36.90	80.68	40.29	51.9	40.01	42.4	59.48
34	30.87	34.63	54.2	34.42	46.6	37.26	81.53	40.39	53.5	40.11	44.0	59.87
35	31.72	34.72	55.8	34.51	48.3	37.63	82.37	40.49	55.2	40.21	45.7	60.26
36	32.56	34.81	57.5	34.60	49.9	37.99	83.22	40.59	56.8	40.31	47.3	60.65
37	33.40	34.90	59.1	34.69	51.5	38.35	84.06	40.69	58.5	40.40	48.9	61.05
38	34.25	35.00	60.8	34.78	53.1	38.72	84.91	40.79	60.1	40.50	50.5	61.44
39	35.09	35.09	62.4	34.88	54.8	39.08	85.76	40.89	61.8	40.60	52.1	61.83
40	635.93	35.18	1264.1	34.97	1256.4	139.45	686.60	40.99	1363.4	40.70	1353.8	162.23
41	36.78	35.28	65.8	35.06	58.0	39.81	87.45	41.09	65.1	40.80	55.4	62.62
42	37.62	35.37	67.4	35.15	59.6	40.18	88.29	41.19	66.8	40.90	57.0	63.01
43	38.46	35.46	69.1	35.24	61.3	40.55	89.14	41.29	68.4	41.00	58.6	63.41
44	39.31	35.56	70.7	35.34	62.9	40.91	89.98	41.40	70.1	41.10	60.2	63.80
45	40.15	35.65	72.4	35.43	64.5	41.28	90.83	41.50	71.7	41.20	61.9	64.20
46	41.00	35.74	74.0	35.52	66.1	41.65	91.67	41.60	73.4	41.30	63.5	64.60
47	41.84	35.84	75.7	35.61	67.8	42.02	92.52	41.70	75.0	41.40	65.1	64.99
48	42.68	35.93	77.4	35.71	69.4	42.39	93.36	41.80	76.7	41.50	66.7	65.39
49	43.53	36.03	79.0	35.80	71.0	42.76	94.21	41.90	78.3	41.60	68.3	65.79
50	644.37	36.12	1280.7	35.89	1272.6	143.13	695.06	42.00	1380.0	41.70	1370.0	166.19
51	45.21	36.21	82.3	35.99	74.3	43.50	95.90	42.11	81.6	41.80	71.6	66.59
52	46.06	36.31	84.0	36.08	75.9	43.87	96.75	42.21	83.3	41.90	73.2	66.98
53	46.90	36.40	85.6	36.17	77.5	44.24	97.59	42.31	85.0	42.00	74.8	67.38
54	47.75	36.50	87.3	36.27	79.1	44.61	98.44	42.41	86.6	42.10	76.4	67.78
55	48.59	36.59	88.9	36.36	80.8	44.98	99.28	42.51	88.3	42.20	78.0	68.18
56	49.43	36.69	90.6	36.45	82.4	45.35	700.13	42.62	89.9	42.30	79.7	68.59
57	50.28	36.78	92.3	36.55	84.0	45.73	00.98	42.72	91.6	42.40	81.3	68.99
58	51.12	36.88	93.9	36.64	85.6	46.10	01.82	42.82	93.2	42.51	82.9	69.39
59	51.97	36.97	95.6	36.74	87.3	46.48	02.67	42.93	94.9	42.61	84.5	69.79

14°						15°						
T	E	C	M	X	Y	T	E	C	M	X	Y	′
703.51	43.03	1396.5	42.71	1386.1	170.20	754.32	49.44	1495.7	49.02	1482.9	195.23	0
04.36	43.13	98.2	42.81	87.7	70.60	55.17	49.55	97.4	49.13	84.6	95.66	1
05.20	43.24	99.8	42.91	89.4	71.00	56.02	49.66	99.0	49.24	86.2	96.10	2
06.05	43.34	1401.5	43.01	91.0	71.41	56.87	49.77	1500.7	49.34	87.8	96.53	3
06.90	43.44	03.2	43.12	92.6	71.81	57.71	49.88	02.3	49.45	89.4	96.96	4
07.74	43.55	04.8	43.22	94.2	72.22	58.56	50.00	04.0	49.56	91.0	97.40	5
08.59	43.65	06.5	43.32	95.8	72.62	59.41	50.11	05.7	49.67	92.6	97.83	6
09.43	43.75	08.1	43.42	97.4	73.03	60.26	50.22	07.3	49.78	94.2	98.26	7
10.28	43.86	09.8	43.52	99.1	73.44	61.11	50.33	09.0	49.89	95.8	98.70	8
11.13	43.96	11.4	43.63	1400.7	73.84	61.95	50.44	10.6	50.00	97.4	99.13	9
711.97	44.07	1413.1	43.73	1402.3	174.25	762.80	50.55	1512.3	50.11	1499.0	199.57	10
12.82	44.17	14.7	43.83	03.9	74.66	63.65	50.67	13.9	50.22	1500.6	200.01	11
13.67	44.27	16.4	43.94	05.5	75.07	64.50	50.78	15.6	50.33	02.3	00.44	12
14.51	44.38	18.0	44.04	07.1	75.48	65.35	50.89	17.2	50.44	03.9	00.88	13
15.36	44.48	19.7	44.14	08.8	75.89	66.20	51.00	18.9	50.55	05.5	01.32	14
16.20	44.59	21.3	44.24	10.4	76.30	67.04	51.12	20.5	50.66	07.1	01.76	15
17.05	44.69	23.0	44.35	12.0	76.71	67.89	51.23	22.2	50.77	08.7	02.19	16
17.90	44.80	24.7	44.45	13.6	77.12	68.74	51.34	23.8	50.88	10.3	02.63	17
18.74	44.90	26.3	44.56	15.2	77.53	69.59	51.45	25.5	51.00	11.9	03.07	18
19.59	45.01	28.0	44.66	16.8	77.94	70.44	51.57	27.1	51.11	13.5	03.51	19
720.44	45.12	1429.6	44.76	1418.4	178.35	771.29	51.68	1528.8	51.22	1515.1	203.95	20
21.28	45.22	31.3	44.87	20.1	78.77	72.13	51.79	30.4	51.33	16.7	04.39	21
22.13	45.33	32.9	44.97	21.7	79.18	72.98	51.91	32.1	51.44	18.3	04.84	22
22.98	45.43	34.6	45.08	23.3	79.59	73.83	52.02	33.7	51.55	19.9	05.28	23
23.82	45.54	36.2	45.18	24.9	80.01	74.68	52.13	35.4	51.66	21.5	05.72	24
24.67	45.65	37.9	45.28	26.5	80.42	75.53	52.25	37.0	51.77	23.2	06.16	25
25.52	45.75	39.5	45.39	28.1	80.84	76.38	52.36	38.7	51.89	24.8	06.61	26
26.36	45.86	41.2	45.49	29.7	81.25	77.23	52.47	40.3	52.00	26.4	07.05	27
27.21	45.96	42.8	45.60	31.4	81.67	78.07	52.59	42.0	52.11	28.0	07.49	28
28.06	46.07	44.5	45.70	33.0	82.09	78.92	52.70	43.6	52.22	29.6	07.94	29
728.90	46.18	1446.2	45.81	1434.6	182.50	779.77	52.82	1545.3	52.34	1531.2	208.38	30
29.75	46.28	47.8	45.91	36.2	82.92	80.62	52.93	46.9	52.45	32.8	08.83	31
30.60	46.39	49.5	46.02	37.8	83.34	81.47	53.05	48.6	52.56	34.4	09.28	32
31.44	46.50	51.1	46.12	39.4	83.76	82.32	53.16	50.3	52.67	36.0	09.72	33
32.29	46.61	52.8	46.23	41.0	84.18	83.17	53.28	51.9	52.79	37.6	10.17	34
33.14	46.71	54.4	46.34	42.7	84.60	84.02	53.39	53.6	52.90	39.2	10.62	35
33.99	46.82	56.1	46.44	44.3	85.02	84.86	53.51	55.2	53.01	40.8	11.07	36
34.83	46.93	57.7	46.55	45.9	85.44	85.71	53.62	56.9	53.12	42.4	11.51	37
35.68	47.04	59.4	46.65	47.5	85.86	86.56	53.74	58.5	53.24	44.0	11.96	38
36.53	47.15	61.0	46.76	49.1	86.28	87.41	53.85	60.2	53.35	45.6	12.41	39
737.37	47.25	1462.7	46.87	1450.7	186.70	788.26	53.97	1561.8	53.46	1547.2	212.86	40
38.22	47.36	64.3	46.97	52.3	87.12	89.11	54.08	63.5	53.58	48.8	13.31	41
39.07	47.47	66.0	47.08	53.9	87.54	89.96	54.20	65.1	53.69	50.4	13.76	42
39.92	47.58	67.6	47.19	55.6	87.97	90.81	54.32	66.8	53.81	52.1	14.21	43
40.76	47.69	69.3	47.29	57.2	88.39	91.66	54.43	68.4	53.92	53.7	14.67	44
41.61	47.80	70.9	47.40	58.8	88.82	92.51	54.55	70.1	54.03	55.3	15.12	45
42.46	47.90	72.6	47.51	60.4	89.24	93.36	54.67	71.7	54.15	56.9	15.57	46
43.30	48.01	74.3	47.61	62.0	89.67	94.21	54.78	73.4	54.26	58.5	16.02	47
44.15	48.12	75.9	47.72	63.6	90.09	95.05	54.90	75.0	54.38	60.1	16.48	48
45.00	48.23	77.6	47.83	65.2	90.52	95.90	55.02	76.7	54.49	61.7	16.93	49
745.85	48.34	1479.2	47.94	1466.8	190.94	796.75	55.13	1578.3	54.61	1563.3	217.39	50
46.69	48.45	80.9	48.04	68.4	91.37	97.60	55.25	80.0	54.72	64.9	17.84	51
47.54	48.56	82.5	48.15	70.1	91.80	98.45	55.37	81.6	54.84	66.5	18.30	52
48.39	48.67	84.2	48.26	71.7	92.23	99.30	55.48	83.3	54.95	68.1	18.75	53
49.24	48.78	85.8	48.37	73.3	92.65	800.15	55.60	84.9	55.07	69.7	19.21	54
50.08	48.89	87.5	48.48	74.9	93.08	01.00	55.72	86.6	55.18	71.3	19.67	55
50.93	49.00	89.1	48.58	76.5	93.51	01.85	55.84	88.2	55.30	72.9	20.12	56
51.78	49.11	90.8	48.69	78.1	93.94	02.70	55.95	89.9	55.41	74.5	20.58	57
52.63	49.22	92.4	48.80	79.7	94.37	03.55	56.07	91.5	55.53	76.1	21.04	58
53.48	49.33	94.1	48.91	81.3	94.80	04.40	56.19	93.2	55.64	77.7	21.50	59

	16°						17°					
I	T	E	C	M	X	Y	T	E	C	M	X	Y
0	805.25	56.31	1594.8	55.76	1579.3	221.96	856.30	63.63	1693.8	62.94	1675.2	250.36
1	06.10	56.43	96.5	55.88	80.9	22.42	57.15	63.76	95.4	63.06	76.8	50.85
2	06.95	56.55	98.1	55.99	82.5	22.88	58.01	63.89	97.1	63.18	78.4	51.33
3	07.80	56.66	99.8	56.11	84.1	23.34	58.86	64.01	98.7	63.31	80.0	51.82
4	08.65	56.78	1601.4	56.23	85.7	23.80	59.71	64.14	1700.4	63.43	81.6	52.31
5	09.50	56.90	03.1	56.34	87.3	24.26	60.56	64.27	02.0	63.55	83.2	52.80
6	10.35	57.02	04.7	56.46	88.9	24.72	61.41	64.39	03.7	63.68	84.7	53.29
7	11.20	57.14	06.4	56.58	90.5	25.18	62.27	64.52	05.3	63.80	86.3	53.78
8	12.05	57.26	08.0	56.69	92.1	25.65	63.12	64.65	07.0	63.92	87.9	54.27
9	12.90	57.38	09.7	56.81	93.7	26.11	63.97	64.77	08.6	64.05	89.5	54.76
10	813.75	57.50	1611.3	56.93	1595.3	226.57	864.82	64.90	1710.3	64.17	1691.1	255.25
11	14.60	57.62	13.0	57.04	96.9	27.04	65.68	65.03	11.9	64.30	92.7	55.75
12	15.45	57.74	14.6	57.16	98.5	27.50	66.53	65.15	13.6	64.42	94.3	56.24
13	16.30	57.86	16.3	57.28	1600.1	27.97	67.38	65.28	15.2	64.55	95.9	56.73
14	17.15	57.98	17.9	57.40	01.7	28.43	68.23	65.41	16.9	64.67	97.5	57.23
15	18.00	58.10	19.6	57.51	03.3	28.90	69.09	65.54	18.5	64.80	99.1	57.72
16	18.85	58.22	21.2	57.63	04.9	29.37	69.94	65.67	20.2	64.92	1700.7	58.21
17	19.70	58.34	22.9	57.75	06.5	29.83	70.79	65.79	21.8	65.05	02.3	58.71
18	20.55	58.46	24.5	57.87	08.1	30.30	71.64	65.92	23.5	65.17	03.9	59.20
19	21.40	58.58	26.2	57.99	09.7	30.77	72.50	66.05	25.1	65.30	05.4	59.70
20	822.25	58.70	1627.8	58.10	1611.3	231.24	873.35	66.18	1726.8	65.42	1707.0	260.20
21	23.10	58.82	29.5	58.22	12.9	31.71	74.20	66.31	28.4	65.55	08.6	60.69
22	23.95	58.94	31.1	58.34	14.5	32.18	75.05	66.44	30.0	65.67	10.2	61.19
23	24.80	59.06	32.8	58.46	16.1	32.65	75.91	66.56	31.7	65.80	11.8	61.69
24	25.66	59.18	34.4	58.58	17.7	33.12	76.76	66.69	33.3	65.93	13.4	62.19
25	26.51	59.31	36.1	58.70	19.3	33.59	77.61	66.82	35.0	66.05	15.0	62.69
26	27.36	59.43	37.7	58.82	20.9	34.06	78.47	66.95	36.6	66.18	16.6	63.18
27	28.21	59.55	39.4	58.94	22.5	34.53	79.32	67.08	38.3	66.30	18.2	63.68
28	29.06	59.67	41.0	59.06	24.1	35.00	80.17	67.21	39.9	66.43	19.8	64.18
29	29.91	59.79	42.7	59.17	25.7	35.48	81.02	67.34	41.6	66.56	21.3	64.68
30	830.76	59.91	1644.3	59.29	1627.3	235.95	881.88	67.47	1743.2	66.68	1722.9	265.19
31	31.61	60.04	46.0	59.41	28.9	36.42	82.73	67.60	44.9	66.81	24.5	65.69
32	32.46	60.16	47.6	59.53	30.5	36.90	83.58	67.73	46.5	66.94	26.1	66.19
33	33.31	60.28	49.3	59.65	32.1	37.37	84.44	67.86	48.2	67.07	27.7	66.69
34	34.16	60.40	50.9	59.77	33.7	37.85	85.29	67.99	49.8	67.19	29.3	67.19
35	35.01	60.53	52.6	59.89	35.3	38.32	86.14	68.12	51.5	67.32	30.9	67.70
36	35.87	60.65	54.2	60.01	36.9	38.80	87.00	68.25	53.1	67.45	32.5	68.20
37	36.72	60.77	55.9	60.13	38.5	39.27	87.85	68.38	54.8	67.57	34.1	68.71
38	37.57	60.89	57.5	60.25	40.1	39.75	88.70	68.51	56.4	67.70	35.7	69.21
39	38.42	61.02	59.2	60.38	41.7	40.23	89.56	68.64	58.1	67.83	37.2	69.71
40	839.27	61.14	1660.8	60.50	1643.3	240.71	890.41	68.77	1759.7	67.96	1738.8	270.22
41	40.12	61.26	62.5	60.62	44.9	41.18	91.26	68.91	61.3	68.09	40.4	70.73
42	40.97	61.39	64.1	60.74	46.5	41.66	92.12	69.04	63.0	68.21	42.0	71.23
43	41.82	61.51	65.8	60.86	48.1	42.14	92.97	69.17	64.6	68.34	43.6	71.74
44	42.68	61.64	67.4	60.98	49.7	42.62	93.82	69.30	66.3	68.47	45.2	72.25
45	43.53	61.76	69.1	61.10	51.3	43.10	94.68	69.43	67.9	68.60	46.8	72.76
46	44.38	61.88	70.7	61.22	52.9	43.58	95.53	69.56	69.6	68.73	48.4	73.26
47	45.23	62.01	72.4	61.34	54.5	44.06	96.39	69.69	71.2	68.86	49.9	73.77
48	46.08	62.13	74.0	61.47	56.1	44.54	97.24	69.83	72.9	68.99	51.5	74.28
49	46.93	62.26	75.7	61.59	57.6	45.03	98.09	69.96	74.5	69.11	53.1	74.79
50	847.78	62.38	1677.3	61.71	1659.2	245.51	898.95	70.09	1776.2	69.24	1754.7	275.30
51	48.64	62.51	79.0	61.83	60.8	45.99	99.80	70.22	77.8	69.37	56.3	75.81
52	49.49	62.63	80.6	61.95	62.4	46.48	900.65	70.36	79.5	69.50	57.9	76.32
53	50.34	62.76	82.3	62.08	64.0	46.96	01.51	70.49	81.1	69.63	59.5	76.84
54	51.19	62.88	83.9	62.20	65.6	47.44	02.36	70.62	82.8	69.76	61.0	77.35
55	52.04	63.01	85.5	62.32	67.2	47.93	03.22	70.75	84.4	69.89	62.6	77.86
56	52.89	63.13	87.2	62.44	68.8	48.41	04.07	70.89	86.0	70.02	64.2	78.37
57	53.75	63.26	88.8	62.57	70.4	48.90	04.92	71.02	87.7	70.15	65.8	78.89
58	54.60	63.38	90.5	62.69	72.0	49.38	05.78	71.15	89.3	70.28	67.4	79.40
59	55.45	63.51	92.1	62.81	73.6	49.87	06.63	71.29	91.0	70.41	69.0	79.91

18°						19°						
T	E	C	M	X	Y	T	E	C	M	X	Y	I
907.49	71.42	1792.6	70.54	1770.6	280.43	958.81	79.67	1891.3	78.58	1865.4	312.16	0
08.34	71.55	94.3	70.67	72.1	80.94	59.67	79.81	93.0	78.72	67.0	12.70	1
09.20	71.69	95.9	70.80	73.7	81.46	60.53	79.95	94.6	78.85	68.5	13.25	2
10.05	71.82	97.6	70.93	75.3	81.98	61.38	80.10	96.3	78.99	70.1	13.79	3
10.90	71.96	99.2	71.06	76.9	82.49	62.24	80.24	97.9	79.13	71.7	14.33	4
11.76	72.09	1800.9	71.19	78.5	83.01	63.10	80.38	99.5	79.27	73.3	14.88	5
12.61	72.22	02.5	71.33	80.1	83.53	63.96	80.52	1901.2	79.41	74.8	15.42	6
13.47	72.36	04.2	71.46	81.7	84.05	64.81	80.66	02.8	79.54	76.4	15.97	7
14.32	72.49	05.8	71.59	83.2	84.57	65.67	80.81	04.5	79.68	78.0	16.51	8
15.18	72.63	07.4	71.72	84.8	85.08	66.53	80.95	06.1	79.82	79.6	17.06	9
916.03	72.76	1809.1	71.85	1786.4	285.60	967.38	81.09	1907.8	79.96	1881.1	317.61	10
16.89	72.90	10.7	71.98	88.0	86.12	68.24	81.23	09.4	80.10	82.7	18.16	11
17.74	73.03	12.4	72.11	89.6	86.64	69.10	81.38	11.1	80.24	84.3	18.70	12
18.60	73.17	14.0	72.25	91.2	87.16	69.96	81.52	12.7	80.38	85.9	19.25	13
19.45	73.30	15.7	72.38	92.7	87.68	70.81	81.66	14.3	80.52	87.4	19.80	14
20.31	73.44	17.3	72.51	94.3	88.21	71.67	81.81	16.0	80.66	89.0	20.35	15
21.16	73.58	19.0	72.64	95.9	88.73	72.53	81.95	17.6	80.79	90.6	20.90	16
22.02	73.71	20.6	72.78	97.5	89.25	73.38	82.09	19.3	80.93	92.2	21.45	17
22.87	73.85	22.3	72.91	99.1	89.77	74.24	82.24	20.9	81.07	93.7	22.00	18
23.73	73.98	23.9	73.04	1800.6	90.30	75.10	82.38	22.6	81.21	95.3	22.55	19
924.58	74.12	1825.6	73.17	1802.2	290.82	975.96	82.53	1924.2	81.35	1896.9	323.10	20
25.44	74.26	27.2	73.31	03.8	91.35	76.81	82.67	25.8	81.49	98.5	23.66	21
26.29	74.39	28.8	73.44	05.4	91.87	77.67	82.81	27.5	81.63	1900.0	24.21	22
27.15	74.53	30.5	73.57	07.0	92.40	78.53	82.96	29.1	81.77	01.6	24.76	23
28.00	74.67	32.1	73.70	08.6	92.92	79.39	83.10	30.8	81.91	03.2	25.31	24
28.86	74.80	33.8	73.84	10.1	93.45	80.24	83.25	32.4	82.05	04.7	25.87	25
29.71	74.94	35.4	73.97	11.7	93.98	81.10	83.39	34.1	82.20	06.3	26.42	26
30.57	75.08	37.1	74.11	13.3	94.50	81.96	83.54	35.7	82.34	07.9	26.98	27
31.42	75.21	38.7	74.24	14.9	95.03	82.82	83.68	37.3	82.48	09.5	27.53	28
32.28	75.35	40.4	74.37	16.5	95.56	83.68	83.83	39.0	82.62	11.0	28.09	29
933.13	75.49	1842.0	74.51	1818.0	296.09	984.53	83.97	1940.6	82.76	1912.6	328.64	30
33.99	75.63	43.6	74.64	19.6	96.62	85.39	84.12	42.3	82.90	14.2	29.20	31
34.84	75.76	45.3	74.77	21.2	97.15	86.25	84.26	43.9	83.04	15.7	29.76	32
35.70	75.90	46.9	74.91	22.8	97.68	87.11	84.41	45.6	83.18	17.3	30.32	33
36.55	76.04	48.6	75.04	24.4	98.21	87.97	84.55	47.2	83.32	18.9	30.87	34
37.41	76.18	50.2	75.18	25.9	98.74	88.82	84.70	48.8	83.47	20.5	31.43	35
38.27	76.32	51.9	75.31	27.5	99.27	89.68	84.85	50.5	83.61	22.0	31.99	36
39.12	76.45	53.5	75.45	29.1	99.80	90.54	84.99	52.1	83.75	23.6	32.55	37
39.98	76.59	55.2	75.58	30.7	300.33	91.40	85.14	53.8	83.89	25.2	33.11	38
40.83	76.73	56.8	75.72	32.3	00.87	92.26	85.28	55.4	84.03	26.7	33.67	39
941.69	76.87	1858.4	75.85	1833.8	301.40	993.12	85.43	1957.1	84.18	1928.3	334.23	40
42.55	77.01	60.1	75.99	35.4	01.93	93.97	85.58	58.7	84.32	29.9	34.79	41
43.40	77.15	61.7	76.12	37.0	02.47	94.83	85.72	60.3	84.46	31.4	35.35	42
44.26	77.29	63.4	76.26	38.6	03.00	95.69	85.87	62.0	84.60	33.0	35.92	43
45.11	77.43	65.0	76.39	40.2	03.54	96.55	86.02	63.6	84.75	34.6	36.48	44
45.97	77.57	66.7	76.53	41.7	04.07	97.41	86.17	65.3	84.89	36.1	37.04	45
46.83	77.70	68.3	76.66	43.3	04.61	98.27	86.31	66.9	85.03	37.7	37.60	46
47.68	77.84	70.0	76.80	44.9	05.14	99.13	86.46	68.5	85.18	39.3	38.17	47
48.54	77.98	71.6	76.94	46.5	05.68	99.98	86.61	70.2	85.32	40.8	38.73	48
49.39	78.12	73.2	77.07	48.0	06.22	1000.8	86.76	71.8	85.46	42.4	39.30	49
950.25	78.26	1874.9	77.21	1849.6	306.76	1001.7	86.90	1973.5	85.61	1944.0	339.86	50
51.11	78.40	76.5	77.35	51.2	07.29	02.6	87.05	75.1	85.75	45.5	40.43	51
51.96	78.54	78.2	77.48	52.8	07.83	03.4	87.20	76.8	85.89	47.1	40.99	52
52.82	78.68	79.8	77.62	54.4	08.37	04.3	87.35	78.4	86.04	48.7	41.56	53
53.68	78.83	81.5	77.76	55.9	08.91	05.1	87.50	80.0	86.18	50.3	42.13	54
54.53	78.97	83.1	77.89	57.5	09.45	06.0	87.64	81.7	86.32	51.8	42.70	55
55.39	79.11	84.8	78.03	59.1	09.99	06.9	87.79	83.3	86.47	53.4	43.26	56
56.24	79.25	86.4	78.17	60.7	10.53	07.7	87.94	85.0	86.61	55.0	43.83	57
57.10	79.39	88.0	78.30	62.2	11.07	08.6	88.09	86.6	86.76	56.5	44.40	58
57.96	79.53	89.7	78.44	63.8	11.62	09.4	88.24	88.2	86.90	58.1	44.97	59

	20°						21°					
I	T	E	C	M	X	Y	T	E	C	M	X	Y
0	1010.3	88.39	1989.9	87.05	1959.7	345.54	1061.9	97.58	2088.3	95.94	2053.3	380.56
1	11.2	88.54	91.5	87.19	61.2	46.11	62.8	97.73	89.9	96.10	54.9	81.16
2	12.0	88.69	93.2	87.34	62.8	46.68	63.7	97.89	91.6	96.25	56.4	81.76
3	12.9	88.84	94.8	87.48	64.4	47.25	64.5	98.05	93.2	96.40	58.0	82.35
4	13.7	88.99	96.5	87.63	65.9	47.82	65.4	98.21	94.8	96.55	59.5	82.95
5	14.6	89.14	98.1	87.77	67.5	48.40	66.2	98.36	96.5	96.70	61.1	83.55
6	15.4	89.29	99.7	87.92	69.1	48.97	67.1	98.52	98.1	96.86	62.7	84.15
7	16.3	89.44	2001.4	88.06	70.6	49.54	68.0	98.68	99.8	97.01	64.2	84.75
8	17.2	89.59	03.0	88.21	72.2	50.12	68.8	98.84	2101.4	97.16	65.8	85.35
9	18.0	89.74	04.7	88.35	73.7	50.69	69.7	99.00	03.0	97.32	67.3	85.95
10	1018.9	89.89	2006.3	88.50	1975.3	351.26	1070.6	99.15	2104.7	97.47	2068.9	386.56
11	19.7	90.04	07.9	88.65	76.9	51.84	71.4	99.31	06.3	97.62	70.4	87.16
12	20.6	90.19	09.6	88.79	78.4	52.41	72.3	99.47	08.0	97.77	72.0	87.76
13	21.5	90.34	11.2	88.94	80.0	52.99	73.1	99.63	09.6	97.93	73.5	88.36
14	22.3	90.49	12.9	89.08	81.6	53.57	74.0	99.79	11.2	98.08	75.1	88.97
15	23.2	90.64	14.5	89.23	83.1	54.14	74.9	99.95	12.9	98.23	76.6	89.57
16	24.0	90.79	16.1	89.38	84.7	54.72	75.7	100.11	14.5	98.39	78.2	90.18
17	24.9	90.94	17.8	89.52	86.3	55.30	76.6	00.27	16.1	98.54	79.7	90.78
18	25.8	91.10	19.4	89.67	87.8	55.87	77.5	00.43	17.8	98.70	81.3	91.38
19	26.6	91.25	21.1	89.82	89.4	56.45	78.3	00.59	19.4	98.85	82.9	91.99
20	1027.5	91.40	2022.7	89.96	1990.9	357.03	1079.2	100.75	2121.1	99.00	2084.4	392.60
21	28.3	91.55	24.3	90.11	92.5	57.61	80.0	00.91	22.7	99.16	86.0	93.20
22	29.2	91.70	26.0	90.26	94.1	58.19	80.9	01.07	24.3	99.31	87.5	93.81
23	30.1	91.86	27.6	90.41	95.6	58.77	81.8	01.23	26.0	99.47	89.1	94.42
24	30.9	92.01	29.3	90.55	97.2	59.35	82.6	01.39	27.6	99.62	90.6	95.03
25	31.8	92.16	30.9	90.70	98.8	59.9	83.5	01.55	29.2	99.78	92.2	95.63
26	32.6	92.31	32.5	90.85	2000.3	60.5	84.4	01.71	30.9	99.93	93.7	96.24
27	33.5	92.47	34.2	91.00	01.9	61.10	85.2	01.87	32.5	100.09	95.3	96.85
28	34.4	92.62	35.8	91.14	03.4	61.68	86.1	02.03	34.2	00.24	96.8	97.46
29	35.2	92.77	37.5	91.29	05.0	62.26	86.9	02.19	35.8	00.40	98.4	98.07
30	1036.1	92.92	2039.1	91.44	2006.6	362.85	1087.8	102.35	2137.4	100.55	2099.9	398.68
31	37.0	93.08	40.7	91.59	08.1	63.43	88.7	02.51	39.1	00.71	2101.5	99.29
32	37.8	93.23	42.4	91.74	09.7	64.01	89.5	02.67	40.7	00.86	03.0	99.91
33	38.7	93.38	44.0	91.89	11.2	64.60	90.4	02.83	42.3	01.02	04.6	400.52
34	39.5	93.54	45.7	92.04	12.8	65.18	91.3	02.99	44.0	01.18	06.1	01.13
35	40.4	93.69	47.3	92.18	14.4	65.77	92.1	03.16	45.6	01.33	07.7	01.74
36	41.3	93.85	48.9	92.33	15.9	66.36	93.0	03.32	47.3	01.49	09.2	02.36
37	42.1	94.00	50.6	92.48	17.5	66.94	93.9	03.48	48.9	01.64	10.8	02.97
38	43.0	94.15	52.2	92.63	19.0	67.53	94.7	03.64	50.5	01.90	12.3	03.58
39	43.8	94.31	53.9	92.78	20.6	68.12	95.6	03.80	52.2	01.96	13.9	04.20
40	1044.7	94.46	2055.5	92.93	2022.2	368.71	1096.4	103.97	2153.8	102.11	2115.4	404.81
41	45.6	94.62	57.1	93.08	23.7	69.29	97.3	04.13	55.4	02.27	17.0	05.43
42	46.4	94.77	58.8	93.23	25.3	69.88	98.2	04.29	57.1	02.43	18.5	06.05
43	47.3	94.93	60.4	93.38	26.8	70.47	99.0	04.45	58.7	02.58	20.1	06.66
44	48.1	95.08	62.1	93.53	28.4	71.06	99.9	04.62	60.4	02.74	21.6	07.28
45	49.0	95.24	63.7	93.68	30.0	71.65	1100.8	04.78	62.0	02.90	23.2	07.90
46	49.9	95.39	65.3	93.83	31.5	72.24	01.6	04.94	63.6	03.06	24.7	08.51
47	50.7	95.55	67.0	93.98	33.1	72.83	02.5	05.11	65.3	03.21	26.3	09.13
48	51.6	95.70	68.6	94.13	34.6	73.43	03.4	05.27	66.9	03.37	27.8	09.75
49	52.4	95.86	70.3	94.28	36.2	74.02	04.2	05.43	68.5	03.53	29.4	10.37
50	1053.3	96.01	2071.9	94.43	2037.8	374.61	1105.1	105.60	2170.2	103.69	2130.9	410.99
51	54.2	96.17	73.5	94.58	39.3	75.20	05.9	05.76	71.8	03.84	32.4	11.61
52	55.0	96.33	75.2	94.73	40.9	75.80	06.8	05.92	73.4	04.00	34.0	12.23
53	55.9	96.48	76.8	94.88	42.4	76.39	07.7	06.09	75.1	04.16	35.5	12.85
54	56.8	96.64	78.5	95.03	44.0	76.98	08.5	06.25	76.7	04.32	37.1	13.47
55	57.6	96.79	80.1	95.19	45.5	77.58	09.4	06.42	78.4	04.48	38.6	14.10
56	58.5	96.95	81.7	95.34	47.1	78.18	10.3	06.58	80.0	04.63	40.2	14.72
57	59.3	97.11	83.4	95.49	48.7	78.77	11.1	06.75	81.6	04.79	41.7	15.34
58	60.2	97.26	85.0	95.64	50.2	79.37	12.0	06.91	83.3	04.95	43.3	15.96
59	61.1	97.42	86.7	95.79	51.8	79.96	12.9	07.08	84.9	05.11	44.8	16.59

22°						23°						I
T	E	C	M	X	Y	T	E	C	M	X	Y	
1113.7	107.24	2186.5	105.27	2146.4	417.21	1165.7	117.38	2284.6	115.02	2238.8	455.48	0
14.6	07.41	88.2	05.43	47.9	17.83	66.6	17.55	86.2	15.19	40.3	56.13	1
15.5	07.57	88.8	05.59	49.5	18.46	67.4	17.73	87.9	15.36	41.8	56.78	2
16.3	07.74	91.4	05.75	51.0	19.09	68.3	17.90	88.5	15.52	43.4	57.43	3
17.2	07.90	93.1	05.91	52.5	19.71	69.2	18.07	91.1	15.69	44.9	58.09	4
18.1	08.07	94.7	06.07	54.1	20.34	70.1	18.25	92.8	15.86	46.4	58.74	5
18.9	08.23	96.4	06.23	55.6	20.97	70.9	18.42	94.4	16.02	48.0	59.39	6
19.8	08.40	98.0	06.39	57.2	21.59	71.8	18.60	96.0	16.19	49.5	60.05	7
20.7	08.56	99.6	06.55	58.7	22.22	72.7	18.77	97.7	16.36	51.0	60.70	8
21.5	08.73	2201.3	06.71	60.3	22.85	73.5	18.94	99.3	16.52	52.6	61.36	9
1122.4	108.90	2202.9	106.87	2161.8	423.48	1174.4	119.12	2300.9	116.69	2254.1	462.01	10
23.2	09.06	04.5	07.03	63.4	24.11	75.3	19.29	02.6	16.86	55.6	62.67	11
24.1	09.23	06.2	07.19	64.9	24.74	76.1	19.47	04.2	17.03	57.1	63.33	12
25.0	09.40	07.8	07.35	66.4	25.37	77.0	19.64	05.8	17.19	58.7	63.98	13
25.8	09.56	09.4	07.51	68.0	26.00	77.9	19.82	07.5	17.36	60.2	64.64	14
26.7	09.73	11.1	07.67	69.5	26.63	78.7	19.99	09.1	17.53	61.7	65.30	15
27.6	09.90	12.7	07.83	71.1	27.26	79.6	20.17	10.7	17.70	63.3	65.96	16
28.4	10.06	14.3	07.99	72.6	27.89	80.5	20.34	12.4	17.87	64.8	66.62	17
29.3	10.23	16.0	08.15	74.2	28.52	81.3	20.52	14.0	18.03	66.3	67.27	18
30.2	10.40	17.6	08.31	75.7	29.15	82.2	20.69	15.6	18.20	67.9	67.93	19
1131.0	110.57	2219.2	108.47	2177.2	429.79	1183.1	120.87	2317.3	118.37	2269.4	468.59	20
31.9	10.73	20.9	08.64	78.8	30.42	83.9	21.04	18.9	18.54	70.9	69.25	21
32.8	10.90	22.5	08.80	80.3	31.06	84.8	21.22	20.5	18.71	72.5	69.91	22
33.6	11.07	24.2	08.96	81.9	31.69	85.7	21.40	22.2	18.88	74.0	70.58	23
34.5	11.24	25.8	09.12	83.4	32.32	86.6	21.57	23.8	19.05	75.5	71.24	24
35.4	11.41	27.4	09.28	84.9	32.96	87.4	21.75	25.4	19.22	77.0	71.90	25
36.2	11.58	29.1	09.44	86.5	33.60	88.3	21.92	27.1	19.38	78.6	72.56	26
37.1	11.74	30.7	09.61	88.0	34.23	89.2	22.10	28.7	19.55	80.1	73.23	27
38.0	11.91	32.3	09.77	89.6	34.87	90.0	22.28	30.3	19.72	81.6	73.89	28
38.8	12.08	34.0	09.93	91.1	35.51	90.9	22.45	32.0	19.89	83.2	74.55	29
1139.7	112.25	2235.6	110.09	2192.6	436.14	1191.8	122.63	2333.6	120.06	2284.7	475.22	30
40.6	12.42	37.2	10.26	94.2	36.78	92.6	22.81	35.2	20.23	86.2	75.88	31
41.4	12.59	38.9	10.42	95.7	37.42	93.5	22.99	36.9	20.40	87.7	76.55	32
42.3	12.76	40.5	10.58	97.3	38.06	94.4	23.16	38.5	20.57	89.3	77.21	33
43.2	12.93	42.1	10.74	98.8	38.70	95.2	23.34	40.1	20.74	90.8	77.88	34
44.0	13.10	43.8	10.91	2200.3	39.34	96.1	23.52	41.8	20.91	92.3	78.55	35
44.9	13.27	45.4	11.07	01.9	39.98	97.0	23.70	43.4	21.08	93.9	79.21	36
45.8	13.44	47.0	11.23	03.4	40.62	97.9	23.87	45.0	21.25	95.4	79.88	37
46.6	13.61	48.7	11.40	05.0	41.26	98.7	24.05	46.6	21.42	96.9	80.55	38
47.5	13.78	50.3	11.56	06.5	41.90	99.6	24.23	48.3	21.59	98.4	81.22	39
1148.4	113.95	2251.9	111.73	2208.0	442.54	1200.5	124.41	2349.9	121.77	2300.0	481.88	40
49.2	14.12	53.6	11.89	09.6	43.19	01.3	24.59	51.5	21.94	01.5	82.55	41
50.1	14.29	55.2	12.05	11.1	43.83	02.2	24.77	53.2	22.11	03.0	83.22	42
51.0	14.46	56.8	12.22	12.6	44.47	03.1	24.94	54.8	22.28	04.5	83.89	43
51.8	14.63	58.5	12.38	14.2	45.12	03.9	25.12	56.4	22.45	06.1	84.56	44
52.7	14.80	60.1	12.55	15.7	45.76	04.8	25.30	58.1	22.62	07.6	85.24	45
53.6	14.97	61.7	12.71	17.3	46.41	05.7	25.48	59.7	22.79	09.1	85.91	46
54.4	15.14	63.4	12.87	18.8	47.05	06.6	25.66	61.3	22.96	10.6	86.58	47
55.3	15.31	65.0	13.04	20.3	47.70	07.4	25.84	63.0	23.14	12.2	87.25	48
56.2	15.49	66.6	13.20	21.9	48.34	08.3	26.02	64.6	23.31	13.7	87.92	49
1157.0	115.66	2268.3	113.37	2223.4	448.99	1209.2	126.20	2366.2	123.48	2315.2	488.60	50
57.9	15.83	69.9	13.53	24.9	49.64	10.0	26.38	67.8	23.65	16.7	89.27	51
58.8	16.00	71.5	13.70	26.5	50.28	10.9	26.56	69.5	23.82	18.3	89.94	52
59.6	16.17	73.2	13.86	28.0	50.93	11.8	26.74	71.1	24.00	19.8	90.62	53
60.5	16.35	74.8	14.03	29.5	51.58	12.6	26.92	72.7	24.17	21.3	91.29	54
61.4	16.52	76.5	14.20	31.1	52.23	13.5	27.10	74.4	24.34	22.8	91.97	55
62.2	16.69	78.1	14.36	32.6	52.88	14.4	27.28	76.0	24.52	24.4	92.65	56
63.1	16.86	79.7	14.53	34.1	53.53	15.3	27.46	77.6	24.69	25.9	93.32	57
64.0	17.04	81.4	14.69	35.7	54.18	16.1	27.64	79.3	24.86	27.4	94.00	58
64.8	17.21	83.0	14.86	37.2	54.83	17.0	27.82	80.9	25.03	28.9	94.68	59

	24°						25°					
/	T	E	C	M	X	Y	T	E	C	M	X	Y
0	1217.9	128.00	2382.5	125.21	2330.5	495.35	1270.2	139.11	2480.2	135.82	2421.5	536.82
1	18.7	28.19	84.2	25.38	32.0	96.03	71.1	39.30	81.9	36.00	23.0	37.53
2	19.6	28.37	85.8	25.55	33.5	96.71	72.0	39.49	83.5	36.18	24.5	38.23
3	20.5	28.55	87.4	25.73	35.0	97.39	72.9	39.68	85.1	36.36	26.0	38.94
4	21.4	28.73	89.0	25.90	36.5	98.07	73.7	39.87	86.8	36.54	27.5	39.64
5	22.2	28.91	90.7	26.07	38.1	98.75	74.6	40.06	88.4	36.72	29.0	40.35
6	23.1	29.09	92.3	26.25	39.6	99.43	75.5	40.25	90.0	36.90	30.5	41.06
7	24.0	29.27	93.9	26.42	41.1	500.11	76.4	40.44	91.6	37.08	32.0	41.76
8	24.8	29.45	95.6	26.60	42.6	00.79	77.2	40.63	93.3	37.26	33.5	42.47
9	25.7	29.64	97.2	26.77	44.2	01.47	78.1	40.82	94.9	37.44	35.0	43.18
10	1226.6	129.82	2398.8	126.95	2345.7	502.16	1279.0	141.01	2496.5	137.63	2436.6	543.89
11	27.5	30.00	2400.5	27.12	47.2	02.84	79.9	41.20	98.1	37.81	38.1	44.60
12	28.3	30.19	02.1	27.29	48.7	03.52	80.7	41.39	99.8	37.99	39.6	45.31
13	29.2	30.37	03.7	27.47	50.2	04.20	81.6	41.58	2501.4	38.17	41.1	46.02
14	30.1	30.55	05.3	27.64	51.8	04.89	82.5	41.78	03.0	38.35	42.6	46.73
15	30.9	30.74	07.0	27.82	53.3	05.57	83.4	41.97	04.6	38.53	44.1	47.44
16	31.8	30.92	08.6	27.99	54.8	06.26	84.2	42.16	06.3	38.72	45.6	48.15
17	32.7	31.10	10.2	28.17	56.3	06.94	85.1	42.35	07.9	38.90	47.1	48.86
18	33.6	31.29	11.9	28.34	57.8	07.63	86.0	42.54	09.5	39.08	48.6	49.57
19	34.4	31.47	13.5	28.52	59.4	08.31	86.9	42.73	11.2	39.26	50.1	50.29
20	1235.3	131.65	2415.1	128.70	2360.9	509.00	1287.7	142.92	2512.8	139.45	2451.6	551.00
21	36.2	31.84	16.7	28.87	62.4	09.69	88.6	43.12	14.4	39.63	53.1	51.71
22	37.0	32.02	18.4	29.05	63.9	10.37	89.5	43.31	16.0	39.81	54.6	52.43
23	37.9	32.20	20.0	29.22	65.4	11.06	90.4	43.50	17.7	40.00	56.1	53.14
24	38.8	32.39	21.6	29.40	66.9	11.75	91.2	43.69	19.3	40.18	57.6	53.85
25	39.7	32.57	23.3	29.58	68.5	12.44	92.1	43.89	20.9	40.36	59.2	54.57
26	40.5	32.76	24.9	29.75	70.0	13.13	93.0	44.08	22.5	40.55	60.7	55.29
27	41.4	32.94	26.5	29.93	71.5	13.82	93.9	44.27	24.2	40.73	62.2	56.00
28	42.3	33.13	28.1	30.10	73.0	14.51	94.7	44.47	25.8	40.91	63.7	56.72
29	43.2	33.31	29.8	30.28	74.5	15.20	95.6	44.66	27.4	41.10	65.2	57.43
30	1244.0	133.50	2431.4	130.46	2376.0	515.89	1296.5	144.85	2529.0	141.28	2466.7	558.15
31	44.9	33.68	33.0	30.64	77.6	16.58	97.4	45.05	30.7	41.46	68.2	58.87
32	45.8	33.87	34.7	30.81	79.1	17.27	98.2	45.24	32.3	41.65	69.7	59.59
33	46.6	34.05	36.3	30.99	80.6	17.97	99.1	45.43	33.9	41.83	71.2	60.31
34	47.5	34.24	37.9	31.17	82.1	18.66	1300.0	45.63	35.5	42.02	72.7	61.03
35	48.4	34.42	39.6	31.34	83.6	19.35	00.9	45.82	37.2	42.20	74.2	61.75
36	49.3	34.61	41.2	31.52	85.1	20.05	01.7	46.01	38.8	42.39	75.7	62.47
37	50.1	34.80	42.8	31.70	86.7	20.74	02.6	46.21	40.4	42.57	77.2	63.19
38	51.0	34.98	44.4	31.88	88.2	21.43	03.5	46.40	42.0	42.76	78.7	63.91
39	51.9	35.17	46.1	32.05	89.7	22.13	04.4	46.60	43.7	42.94	80.2	64.63
40	1252.8	135.36	2447.7	132.23	2391.2	522.82	1305.3	146.79	2545.3	143.13	2481.7	565.35
41	53.6	35.54	49.3	32.41	92.7	23.52	06.1	46.99	46.9	43.31	83.2	66.07
42	54.5	35.73	50.9	32.59	94.2	24.22	07.0	47.18	48.5	43.50	84.7	66.79
43	55.4	35.92	52.6	32.77	95.7	24.91	07.9	47.38	50.2	43.68	86.2	67.52
44	56.3	36.10	54.2	32.94	97.3	25.61	08.8	47.57	51.8	43.87	87.7	68.24
45	57.1	36.29	55.8	33.12	98.8	26.31	09.6	47.77	53.4	44.05	89.2	68.96
46	58.0	36.48	57.5	33.30	2400.3	27.01	10.5	47.96	55.0	44.24	90.7	69.69
47	58.9	36.66	59.1	33.48	01.8	27.70	11.4	48.16	56.7	44.42	92.2	70.41
48	59.7	36.85	60.7	33.66	03.3	28.40	12.3	48.35	58.3	44.61	93.7	71.14
49	60.6	37.04	62.3	33.84	04.8	29.10	13.1	48.55	59.9	44.80	95.2	71.86
50	1261.5	137.23	2464.0	134.02	2406.3	529.80	1314.0	148.75	2561.5	144.98	2496.7	572.59
51	62.4	37.42	65.6	34.20	07.9	30.50	14.9	48.94	63.2	45.17	98.2	73.32
52	63.2	37.60	67.2	34.38	09.4	31.20	15.8	49.14	64.8	45.35	99.7	74.04
53	64.1	37.79	68.9	34.56	10.9	31.90	16.7	49.33	66.4	45.54	2501.2	74.77
54	65.0	37.98	70.5	34.74	12.4	32.60	17.5	49.53	68.0	45.73	02.7	75.50
55	65.9	38.17	72.1	34.92	13.9	33.31	18.4	49.73	69.7	45.91	04.2	76.23
56	66.7	38.36	73.7	35.10	15.4	34.01	19.3	49.92	71.3	46.10	05.7	76.96
57	67.6	38.55	75.4	35.28	16.9	34.71	20.2	50.12	72.9	46.29	07.2	77.68
58	68.5	38.74	77.0	35.46	18.4	35.42	21.0	50.32	74.5	46.48	08.7	78.41
59	69.4	38.92	78.6	35.64	19.9	36.12	21.9	50.52	76.2	46.66	10.2	79.14

26°						27°						
T	E	C	M	X	Y	T	E	C	M	X	Y	I
1322.8	150.71	2577.8	146.85	2511.7	579.87	1375.6	162.81	2675.1	158.31	2601.2	624.50	0
23.7	50.91	79.4	47.04	13.2	80.61	76.4	63.02	76.7	58.51	02.7	25.25	1
24.5	51.11	81.0	47.23	14.7	81.34	77.3	63.22	78.4	58.70	04.2	26.01	2
25.4	51.31	82.7	47.41	16.2	82.07	78.2	63.43	80.0	58.90	05.7	26.77	3
26.3	51.50	84.3	47.60	17.7	82.80	79.1	63.63	81.6	59.09	07.1	27.52	4
27.2	51.70	85.9	47.79	19.2	83.53	80.0	63.84	83.2	59.29	08.6	28.28	5
28.1	51.90	87.5	47.98	20.7	84.27	80.9	64.04	84.8	59.48	10.1	29.04	6
29.0	52.10	89.1	48.17	22.2	85.00	81.7	64.25	86.5	59.68	11.6	29.80	7
29.8	52.30	90.8	48.35	23.7	85.73	82.6	64.46	88.1	59.87	13.1	30.56	8
30.7	52.50	92.4	48.54	25.2	86.47	83.5	64.67	89.7	60.07	14.6	31.32	9
1331.6	152.69	2594.0	148.73	2526.7	587.20	1384.4	164.87	2691.3	160.26	2616.0	632.08	10
32.5	52.89	95.6	48.92	28.2	87.94	85.3	65.08	92.9	60.46	17.5	32.84	11
33.3	53.09	97.3	49.11	29.7	88.67	86.1	65.29	94.6	60.65	19.0	33.61	12
34.2	53.29	98.9	49.30	31.2	89.41	87.0	65.50	96.2	60.85	20.5	34.37	13
35.1	53.49	2600.5	49.49	32.7	90.15	87.9	65.70	97.8	61.05	22.0	35.13	14
36.0	53.69	02.1	49.68	34.2	90.88	88.8	65.91	99.4	61.24	23.5	35.89	15
36.8	53.89	03.8	49.86	35.7	91.62	89.7	66.12	2701.0	61.44	24.9	36.66	16
37.7	54.09	05.4	50.05	37.1	92.36	90.6	66.33	02.7	61.63	26.4	37.42	17
38.6	54.29	07.0	50.24	38.6	93.10	91.4	66.54	04.3	61.83	27.9	38.18	18
39.5	54.49	08.6	50.43	40.1	93.84	92.3	66.74	05.9	62.03	29.4	38.95	19
1340.4	154.69	2610.3	150.62	2541.6	594.57	1393.2	166.95	2707.5	162.23	2630.9	639.71	20
41.2	54.89	11.9	50.81	43.1	95.31	94.1	67.16	09.1	62.42	32.3	40.48	21
42.1	55.09	13.5	51.00	44.6	96.05	95.0	67.37	10.8	62.62	33.8	41.25	22
43.0	55.29	15.1	51.19	46.1	96.79	95.9	67.58	12.4	62.82	35.3	42.01	23
43.9	55.49	16.7	51.38	47.6	97.53	96.7	67.79	14.0	63.01	36.8	42.78	24
44.8	55.69	18.4	51.57	49.1	98.28	97.6	68.00	15.6	63.21	38.3	43.55	25
45.6	55.89	20.0	51.76	50.6	99.02	98.5	68.21	17.2	63.41	39.7	44.31	26
46.5	56.09	21.6	51.96	52.1	99.76	99.4	68.42	18.9	63.61	41.2	45.08	27
47.4	56.30	23.2	52.15	53.6	600.50	1400.3	68.62	20.5	63.80	42.7	45.85	28
48.3	56.50	24.9	52.34	55.1	01.25	01.2	68.83	22.1	64.00	44.2	46.62	29
1349.2	156.70	2626.5	152.53	2556.6	601.99	1402.0	169.04	2723.7	164.20	2645.7	647.39	30
50.0	56.90	28.1	52.72	58.0	02.73	02.9	69.25	25.3	64.40	47.1	48.16	31
50.9	57.10	29.7	52.91	59.5	03.48	03.8	69.46	27.0	64.60	48.6	48.93	32
51.8	57.30	31.3	53.10	61.0	04.22	04.7	69.67	28.6	64.79	50.1	49.70	33
52.7	57.51	33.0	53.29	62.5	04.97	05.6	69.89	30.2	64.99	51.6	50.47	34
53.6	57.71	34.6	53.48	64.0	05.71	06.5	70.10	31.8	65.19	53.0	51.24	35
54.4	57.91	36.2	53.68	65.5	06.46	07.3	70.31	33.4	65.39	54.5	52.01	36
55.3	58.11	37.8	53.87	67.0	07.21	08.2	70.52	35.0	65.59	56.0	52.79	37
56.2	58.32	39.5	54.06	68.5	07.95	09.1	70.73	36.7	65.79	57.5	53.56	38
57.1	58.52	41.1	54.25	70.0	08.70	10.0	70.94	38.3	65.99	59.0	54.33	39
1358.0	158.72	2642.7	154.44	2571.5	609.45	1410.9	171.15	2739.9	166.19	2660.4	655.11	40
58.8	58.93	44.3	54.64	73.0	10.20	11.8	71.36	41.5	66.39	61.9	55.88	41
59.7	59.13	45.9	54.83	74.4	10.94	12.6	71.57	43.1	66.59	63.4	56.65	42
60.6	59.33	47.6	55.02	75.9	11.69	13.5	71.79	44.8	66.78	64.9	57.43	43
61.5	59.53	49.2	55.21	77.4	12.44	14.4	72.00	46.4	66.98	66.3	58.20	44
62.4	59.74	50.8	55.41	78.9	13.19	15.3	72.21	48.0	67.18	67.8	58.98	45
63.2	59.94	52.4	55.60	80.4	13.94	16.2	72.42	49.6	67.38	69.3	59.76	46
64.1	60.15	54.0	55.79	81.9	14.69	17.1	72.63	51.2	67.58	70.8	60.53	47
65.0	60.35	55.7	55.98	83.4	15.45	17.9	72.85	52.8	67.78	72.2	61.31	48
65.9	60.55	57.3	56.18	84.9	16.20	18.8	73.06	54.5	67.98	73.7	62.09	49
1366.8	160.76	2658.9	156.37	2586.3	616.95	1419.7	173.27	2756.1	168.18	2675.2	662.87	50
67.6	60.96	60.5	56.56	87.8	17.70	20.6	73.48	57.7	68.39	76.7	63.64	51
68.5	61.17	62.2	56.76	89.3	18.45	21.5	73.70	59.3	68.59	78.1	64.42	52
69.4	61.37	63.8	56.95	90.8	19.21	22.4	73.91	60.9	68.79	79.6	65.20	53
70.3	61.58	65.4	57.15	92.3	19.96	23.3	74.12	62.6	68.99	81.1	65.98	54
71.2	61.78	67.0	57.34	93.8	20.72	24.1	74.34	64.2	69.19	82.5	66.76	55
72.0	61.99	68.6	57.53	95.3	21.47	25.0	74.55	65.8	69.39	84.0	67.54	56
72.9	62.19	70.3	57.73	96.8	22.23	25.9	74.76	67.4	69.59	85.5	68.32	57
73.8	62.40	71.9	57.92	98.2	22.98	26.8	74.98	69.0	69.79	87.0	69.10	58
74.7	62.60	73.5	58.12	99.7	23.74	27.7	75.19	70.6	70.00	88.4	69.89	59

	28°						29°					
/	T	E	C	M	X	Y	T	E	C	M	X	Y
0	1428.6	175.41	2772.3	170.20	2689.9	670.67	1481.8	188.51	2869.2	182.50	27778	718.38
1	29.4	75.62	73.9	70.40	91.4	71.45	82.7	88.73	70.8	82.71	79.2	19.19
2	30.3	75.83	75.5	70.60	92.9	72.23	83.6	88.95	72.4	82.92	80.7	20.00
3	31.2	76.05	77.1	70.80	94.3	73.02	84.5	89.18	74.0	83.13	82.2	20.81
4	32.1	76.26	78.7	71.00	95.8	73.80	85.3	89.40	75.6	83.34	83.6	21.62
5	33.0	76.48	80.3	71.21	97.3	74.59	86.2	89.62	77.2	83.55	85.1	22.43
6	33.9	76.69	82.0	71.41	98.7	75.37	87.1	89.85	78.9	83.76	86.5	23.24
7	34.8	76.91	83.6	71.61	2700.2	76.16	88.0	90.07	80.5	83.97	88.0	24.05
8	35.6	77.12	85.2	71.81	01.7	76.94	88.9	90.29	82.1	84.18	89.4	24.86
9	36.5	77.34	86.8	72.01	03.1	77.73	89.8	90.52	83.7	84.39	90.9	25.67
10	1437.4	177.55	2788.4	172.22	2704.6	678.52	1490.7	190.74	2885.3	184.60	2792.4	726.49
11	38.3	77.77	90.0	72.42	06.1	79.30	91.6	90.96	86.9	84.81	93.8	27.30
12	39.2	77.99	91.7	72.62	07.6	80.09	92.5	91.19	88.5	85.02	95.3	28.11
13	40.1	78.20	93.3	72.83	09.0	80.88	93.4	91.41	90.2	85.23	96.7	28.93
14	41.0	78.42	94.9	73.03	10.5	81.67	94.2	91.64	91.8	85.44	98.2	29.74
15	41.8	78.63	96.5	73.23	12.0	82.46	95.1	91.86	93.4	85.65	99.6	30.55
16	42.7	78.85	98.1	73.44	13.4	83.24	96.0	92.09	95.0	85.86	2801.1	31.37
17	43.6	79.07	99.7	73.64	14.9	84.03	96.9	92.31	96.6	86.07	02.5	32.18
18	44.5	79.28	2801.4	73.84	16.4	84.82	97.8	92.54	98.2	86.28	04.0	33.00
19	45.4	79.50	03.0	74.05	17.8	85.61	98.7	92.76	99.8	86.49	05.4	33.81
20	1446.3	179.72	2804.6	174.25	2719.3	686.40	1499.6	192.99	2901.4	186.70	2806.9	734.63
21	47.2	79.94	06.2	74.46	20.8	87.20	1500.5	93.21	03.1	86.91	08.3	35.45
22	48.1	80.15	07.8	74.66	22.2	87.99	01.4	93.44	04.7	87.12	09.8	36.26
23	48.9	80.37	09.4	74.86	23.7	88.78	02.3	93.67	06.3	87.33	11.3	37.08
24	49.8	80.59	11.1	75.07	25.2	89.57	03.1	93.89	07.9	87.54	12.7	37.90
25	50.7	80.80	12.7	75.27	26.6	90.36	04.0	94.12	09.5	87.76	14.2	38.72
26	51.6	81.02	14.3	75.48	28.1	91.16	04.9	94.34	11.1	87.97	15.6	39.54
27	52.5	81.24	15.9	75.68	29.6	91.95	05.8	94.57	12.7	88.18	17.1	40.36
28	53.4	81.46	17.5	75.89	31.0	92.75	06.7	94.80	14.3	88.39	18.5	41.18
29	54.3	81.67	19.1	76.09	32.5	93.54	07.6	95.02	15.9	88.60	20.0	42.00
30	1455.1	181.89	2820.7	176.30	2734.0	694.33	1508.5	195.25	2917.6	188.82	2821.4	742.82
31	56.0	82.11	22.4	76.50	35.4	95.13	09.4	95.48	19.2	89.03	22.9	43.64
32	56.9	82.33	24.0	76.71	36.9	95.93	10.3	95.70	20.8	89.24	24.3	44.46
33	57.8	82.55	25.6	76.91	38.3	96.72	11.2	95.93	22.4	89.45	25.8	45.28
34	58.7	82.77	27.2	77.12	39.8	97.52	12.1	96.16	24.0	89.67	27.2	46.10
35	59.6	82.99	28.8	77.32	41.3	98.32	12.9	96.39	25.6	89.88	28.7	46.93
36	60.5	83.21	30.4	77.53	42.7	99.11	13.8	96.61	27.2	90.09	30.1	47.75
37	61.4	83.42	32.1	77.73	44.2	99.91	14.7	96.84	28.8	90.30	31.6	48.57
38	62.2	83.64	33.7	77.94	45.7	700.71	15.6	97.07	30.5	90.52	33.0	49.40
39	63.1	83.86	35.3	78.15	47.1	01.51	16.5	97.30	32.1	90.73	34.5	50.22
40	1464.0	184.08	2836.9	178.35	2748.6	702.31	1517.4	197.53	2933.7	190.94	2835.9	751.05
41	64.9	84.30	38.5	78.56	50.1	03.11	18.3	97.75	35.3	91.16	37.4	51.87
42	65.8	84.52	40.1	78.77	51.5	03.91	19.2	97.98	36.9	91.37	38.8	52.70
43	66.7	84.74	41.7	78.97	53.0	04.71	20.1	98.21	38.5	91.58	40.3	53.52
44	67.6	84.96	43.4	79.18	54.4	05.51	21.0	98.44	40.1	91.80	41.7	54.35
45	68.5	85.18	45.0	79.39	55.9	06.31	21.9	98.67	41.7	92.01	43.1	55.17
46	69.3	85.40	46.6	79.59	57.4	07.11	22.8	98.90	43.3	92.23	44.6	56.00
47	70.2	85.63	48.2	79.80	58.8	07.92	23.6	99.13	45.0	92.44	46.0	56.83
48	71.1	85.85	49.8	80.01	60.3	08.72	24.5	99.36	46.6	92.65	47.5	57.66
49	72.0	86.07	51.4	80.21	61.7	09.52	25.4	99.59	48.2	92.87	48.9	58.49
50	1472.9	186.29	2853.0	180.42	2763.2	710.33	1526.3	199.82	2949.8	193.08	2850.4	759.32
51	73.8	86.51	54.7	80.63	64.7	11.13	27.2	200.05	51.4	93.30	51.8	60.14
52	74.7	86.73	56.3	80.84	66.1	11.93	28.1	00.28	53.0	93.51	53.3	60.97
53	75.6	86.95	57.9	81.05	67.6	12.74	29.0	00.51	54.6	93.73	54.7	61.80
54	76.5	87.17	59.5	81.25	69.0	13.54	29.9	00.74	56.2	93.94	56.2	62.64
55	77.3	87.40	61.1	81.46	70.5	14.35	30.8	00.97	57.8	94.16	57.6	63.47
56	78.2	87.62	62.7	81.67	72.0	15.15	31.7	01.20	59.4	94.37	59.0	64.30
57	79.1	87.84	64.3	81.88	73.4	15.96	32.6	01.43	61.1	94.59	60.5	65.13
58	80.0	88.06	66.0	82.09	74.9	16.77	33.5	01.66	62.7	94.80	61.9	65.96
59	80.9	88.28	67.6	82.29	76.3	17.58	34.4	01.89	64.3	95.02	63.4	66.79

30°						31°						
T	E	C	M	X	Y	T	E	C	M	X	Y	′
1535.3	202.12	2965.9	195.23	2864.8	767.63	1589.0	216.25	3062.4	208.38	2957.0	818.38	0
36.1	02.35	67.5	95.45	66.3	68.46	89.9	16.49	64.0	08.61	52.4	19.24	1
37.0	02.58	69.1	95.66	67.7	69.30	90.8	16.73	65.6	08.83	53.8	20.10	2
37.9	02.81	70.7	95.88	69.2	70.13	91.7	16.97	67.2	09.05	55.3	20.96	3
38.8	03.05	72.3	96.10	70.6	70.96	92.6	17.21	68.8	09.28	56.7	21.82	4
39.7	03.28	73.9	96.31	72.0	71.80	93.5	17.45	70.4	09.50	58.1	22.68	5
40.6	03.51	75.5	96.53	73.5	72.63	94.4	17.69	72.0	09.72	59.6	23.54	6
41.5	03.74	77.2	96.75	74.9	73.47	95.3	17.93	73.6	09.95	61.0	24.40	7
42.4	03.97	78.8	96.96	76.4	74.31	96.2	18.17	75.2	10.17	62.4	25.26	8
43.3	04.21	80.4	97.18	77.8	75.15	97.1	18.41	76.8	10.39	63.8	26.12	9
1544.2	204.44	2982.0	197.40	2879.2	775.98	1598.0	218.66	3078.4	210.62	2965.3	826.99	10
45.1	04.67	83.6	97.61	80.7	76.82	98.8	18.90	80.0	10.84	66.7	27.85	11
46.0	04.90	85.2	97.83	82.1	77.66	99.7	19.14	81.6	11.07	68.1	28.71	12
46.9	05.14	86.8	98.05	83.6	78.50	1600.6	19.38	83.2	11.29	69.5	29.58	13
47.8	05.37	88.4	98.26	85.0	79.33	01.5	19.62	84.8	11.51	71.0	30.44	14
48.7	05.60	90.0	98.48	86.4	80.17	02.4	19.86	86.4	11.74	72.4	31.30	15
49.6	05.84	91.6	98.70	87.9	81.01	03.3	20.11	88.1	11.96	73.8	32.17	16
50.4	06.07	93.2	98.92	89.3	81.85	04.2	20.35	89.7	12.19	75.2	33.03	17
51.3	06.30	94.9	99.13	90.8	82.70	05.1	20.59	91.3	12.41	76.7	33.90	18
52.2	06.54	96.5	99.35	92.2	83.54	06.0	20.83	92.9	12.64	78.1	34.77	19
1553.1	206.77	2998.1	199.57	2893.6	784.38	1606.9	221.08	3094.5	212.86	2979.5	835.63	20
54.0	07.01	99.7	99.79	95.1	85.22	07.8	21.32	96.1	13.09	80.9	36.50	21
54.9	07.24	3001.3	200.01	96.5	86.06	08.7	21.56	97.7	13.31	82.4	37.37	22
55.8	07.48	02.9	00.22	98.0	86.90	09.6	21.80	99.3	13.54	83.8	38.23	23
56.7	07.71	04.5	00.44	99.4	87.75	10.5	22.05	3100.9	13.76	85.2	39.10	24
57.6	07.94	06.1	00.66	2900.8	88.59	11.4	22.29	02.5	13.99	86.6	39.97	25
58.5	08.18	07.7	00.88	02.3	89.44	12.3	22.53	04.1	14.21	88.0	40.84	26
59.4	08.41	09.3	01.10	03.7	90.28	13.2	22.78	05.7	14.44	89.5	41.71	27
60.3	08.65	10.9	01.32	05.1	91.12	14.1	23.02	07.3	14.67	90.9	42.58	28
61.2	08.88	12.5	01.54	06.6	91.97	15.0	23.27	08.9	14.89	92.3	43.45	29
1562.1	209.12	3014.2	201.76	2908.0	792.82	1615.9	223.51	3110.5	215.12	2993.7	844.32	30
63.0	09.36	15.8	01.98	09.5	93.66	16.8	23.75	12.1	15.34	95.2	45.19	31
63.9	09.59	17.4	02.19	10.9	94.51	17.7	24.00	13.7	15.57	96.6	46.06	32
64.8	09.83	19.0	02.41	12.3	95.36	18.6	24.24	15.3	15.80	98.0	46.93	33
65.7	10.06	20.6	02.63	13.8	96.20	19.5	24.49	16.9	16.02	99.4	47.81	34
66.6	10.30	22.2	02.85	15.2	97.05	20.4	24.73	18.5	16.25	3000.8	48.68	35
67.5	10.53	23.8	03.07	16.6	97.90	21.3	24.98	20.1	16.48	02.3	49.55	36
68.4	10.77	25.4	03.29	18.1	98.75	22.2	25.22	21.7	16.70	03.7	50.43	37
69.2	11.01	27.0	03.51	19.5	99.60	23.1	25.47	23.3	16.93	05.1	51.30	38
70.1	11.25	28.6	03.73	20.9	800.45	24.0	25.71	25.0	17.16	06.5	52.17	39
1571.0	211.48	3030.2	203.95	2922.4	801.30	1624.9	225.96	3126.6	217.39	3007.9	853.05	40
71.9	11.72	31.8	04.17	23.8	02.15	25.8	26.21	28.2	17.61	09.4	53.92	41
72.8	11.96	33.4	04.39	25.2	03.00	26.7	26.45	29.8	17.84	10.8	54.80	42
73.7	12.19	35.1	04.62	26.7	03.85	27.6	26.70	31.4	18.07	12.2	55.68	43
74.6	12.43	36.7	04.84	28.1	04.70	28.5	26.94	33.0	18.30	13.6	56.55	44
75.5	12.67	38.3	05.06	29.5	05.55	29.4	27.19	34.6	18.52	15.0	57.43	45
76.4	12.91	39.9	05.28	31.0	06.40	30.3	27.44	36.2	18.75	16.4	58.31	46
77.3	13.14	41.5	05.50	32.4	07.26	31.2	27.68	37.8	18.98	17.9	59.18	47
78.2	13.38	43.1	05.72	33.8	08.11	32.1	27.93	39.4	19.21	19.3	60.06	48
79.1	13.62	44.7	05.94	35.3	08.96	33.0	28.18	41.0	19.44	20.7	60.94	49
1580.0	213.86	3046.3	206.16	2936.7	809.82	1633.9	228.42	3142.6	219.67	3022.1	861.82	50
80.9	14.10	47.9	06.39	38.1	10.67	34.8	28.67	44.2	19.89	23.5	62.70	51
81.8	14.34	49.5	06.61	39.6	11.53	35.7	28.92	45.8	20.12	24.9	63.58	52
82.7	14.57	51.1	06.83	41.0	12.38	36.6	29.17	47.4	20.35	26.4	64.46	53
83.6	14.81	52.7	07.05	42.4	13.24	37.5	29.41	49.0	20.58	27.8	65.34	54
84.5	15.05	54.3	07.27	43.8	14.09	38.4	29.66	50.6	20.81	29.2	66.22	55
85.4	15.29	55.9	07.49	45.3	14.95	39.3	29.91	52.2	21.04	30.6	67.10	56
86.3	15.53	57.5	07.72	46.7	15.81	40.2	30.16	53.8	21.27	32.0	67.98	57
87.2	15.77	59.2	07.94	48.1	16.67	41.1	30.40	55.4	21.50	33.4	68.87	58
88.1	16.01	60.8	08.16	49.6	17.52	42.0	30.65	57.0	21.73	34.8	69.75	59

	32°						33°					
I	T	E	C	M	X	Y	T	E	C	M	X	Y
0	1643.0	230.90	3158.6	221.96	3036.3	870.63	1697.2	246.08	3254.6	235.95	3120.6	924.36
1	43.9	31.15	60.2	22.19	37.7	71.52	98.1	46.34	56.2	36.19	22.0	25.27
2	44.8	31.40	61.8	22.42	39.1	72.40	99.0	46.60	57.8	36.42	23.4	26.18
3	45.7	31.65	63.4	22.65	40.5	73.28	99.9	46.86	59.4	36.66	24.8	27.09
4	46.6	31.90	65.0	22.88	41.9	74.17	1700.8	47.11	61.0	36.90	26.2	28.00
5	47.5	32.15	66.6	23.11	43.3	75.05	01.7	47.37	62.6	37.13	27.6	28.90
6	48.4	32.40	68.2	23.34	44.7	75.94	02.6	47.63	64.2	37.37	29.0	29.81
7	49.3	32.65	69.8	23.57	46.1	76.82	03.5	47.89	65.8	37.61	30.4	30.72
8	50.2	32.89	71.4	23.80	47.6	77.71	04.5	48.15	67.4	37.85	31.8	31.64
9	51.1	33.14	73.0	24.03	49.0	78.60	05.4	48.41	69.0	38.08	33.2	32.55
10	1652.0	233.39	3174.6	224.26	3050.4	879.48	1706.3	248.66	3270.6	238.32	3134.6	933.46
11	52.9	33.64	76.2	24.49	51.8	80.37	07.2	48.92	72.2	38.56	36.0	34.37
12	53.8	33.90	77.8	24.72	53.2	81.26	08.1	49.18	73.8	38.80	37.3	35.28
13	54.7	34.15	79.4	24.95	54.6	82.15	09.0	49.44	75.4	39.04	38.7	36.20
14	55.6	34.40	81.0	25.18	56.0	83.04	09.9	49.70	77.0	39.27	40.1	37.11
15	56.5	34.65	82.6	25.42	57.4	83.93	10.8	49.96	78.6	39.51	41.5	38.02
16	57.4	34.90	84.2	25.65	58.8	84.81	11.7	50.22	80.2	39.75	42.9	38.94
17	58.3	35.15	85.8	25.88	60.2	85.70	12.6	50.48	81.8	39.99	44.3	39.85
18	59.2	35.40	87.4	26.11	61.7	86.59	13.5	50.74	83.4	40.23	45.7	40.77
19	60.1	35.65	89.0	26.34	63.1	87.49	14.4	51.00	85.0	40.47	47.1	41.68
20	1661.0	235.90	3190.6	226.57	3064.5	888.38	1715.3	251.26	3286.6	240.71	3148.5	942.60
21	61.9	36.15	92.2	26.81	65.9	89.27	16.3	51.52	88.2	40.94	49.9	43.51
22	62.8	36.41	93.8	27.04	67.3	90.16	17.2	51.78	89.8	41.18	51.3	44.43
23	63.7	36.66	95.4	27.27	68.7	91.05	18.1	52.04	91.4	41.42	52.7	45.35
24	64.6	36.91	97.0	27.50	70.1	91.95	19.0	52.30	93.0	41.66	54.1	46.26
25	65.5	37.16	98.6	27.74	71.5	92.84	19.9	52.57	94.5	41.90	55.5	47.18
26	66.4	37.41	3200.2	27.97	72.9	93.73	20.8	52.83	96.1	42.14	56.8	48.10
27	67.3	37.67	01.8	28.20	74.3	94.63	21.7	53.09	97.7	42.38	58.2	49.02
28	68.2	37.92	03.4	28.43	75.7	95.52	22.6	53.35	99.3	42.62	59.6	49.94
29	69.1	38.17	05.0	28.67	77.1	96.42	23.5	53.61	3300.9	42.86	61.0	50.86
30	1670.0	238.43	3206.6	228.90	3078.5	897.31	1724.4	253.87	3302.5	243.10	3162.4	951.78
31	70.9	38.68	08.2	29.13	79.9	98.21	25.3	54.13	04.1	43.34	63.8	52.70
32	71.8	38.93	09.8	29.37	81.3	99.10	26.2	54.40	05.7	43.58	65.2	53.62
33	72.8	39.19	11.4	29.60	82.8	900.00	27.2	54.66	07.3	43.82	66.6	54.54
34	73.7	39.44	13.0	29.83	84.2	00.90	28.1	54.92	08.9	44.06	68.0	55.46
35	74.6	39.69	14.6	30.07	85.6	01.80	29.0	55.18	10.5	44.30	69.4	56.38
36	75.5	39.95	16.2	30.30	87.0	02.69	29.9	55.45	12.1	44.54	70.7	57.30
37	76.4	40.20	17.8	30.54	88.4	03.59	30.8	55.71	13.7	44.79	72.1	58.23
38	77.3	40.45	19.4	30.77	89.8	04.49	31.7	55.97	15.3	45.03	73.5	59.15
39	78.2	40.71	21.0	31.00	91.2	05.39	32.6	56.24	16.9	45.27	74.9	60.07
40	1679.1	240.96	3222.6	231.24	3092.6	906.29	1733.5	256.50	3318.5	245.51	3176.3	960.99
41	80.0	41.22	24.2	31.47	94.0	07.19	34.4	56.76	20.1	45.75	77.7	61.92
42	80.9	41.47	25.8	31.71	95.4	08.09	35.3	57.03	21.7	45.99	79.1	62.84
43	81.8	41.73	27.4	31.94	96.8	08.99	36.3	57.29	23.3	46.23	80.5	63.77
44	82.7	41.98	29.0	32.18	98.2	09.89	37.2	57.55	24.9	46.48	81.8	64.69
45	83.6	42.24	30.6	32.41	99.6	10.79	38.1	57.82	26.5	46.72	83.2	65.62
46	84.5	42.49	32.2	32.65	3101.0	11.69	39.0	58.08	28.1	46.96	84.6	66.55
47	85.4	42.75	33.8	32.88	02.4	12.59	39.9	58.35	29.6	47.20	86.0	67.47
48	86.3	43.00	35.4	33.12	03.8	13.50	40.8	58.61	31.2	47.44	87.4	68.40
49	87.2	43.26	37.0	33.35	05.2	14.40	41.7	58.88	32.8	47.69	88.8	69.33
50	1688.1	243.52	3238.6	233.59	3106.6	915.30	1742.6	259.14	3334.4	247.93	3190.1	970.26
51	89.1	43.77	40.2	33.82	08.0	16.21	43.5	59.41	36.0	48.17	91.5	71.18
52	90.0	44.03	41.8	34.06	09.4	17.11	44.4	59.67	37.6	48.41	92.9	72.11
53	90.9	44.28	43.4	34.29	10.8	18.02	45.4	59.94	39.2	48.66	94.3	73.04
54	91.8	44.54	45.0	34.53	12.2	18.92	46.3	60.20	40.8	48.90	95.7	73.97
55	92.7	44.80	46.6	34.77	13.6	19.83	47.2	60.47	42.4	49.14	97.1	74.90
56	93.6	45.05	48.2	35.00	15.0	20.73	48.1	60.73	44.0	49.38	98.4	75.83
57	94.5	45.31	49.8	35.24	16.4	21.64	49.0	61.00	45.6	49.63	99.8	76.76
58	95.4	45.57	51.4	35.48	17.8	22.55	49.9	61.27	47.2	49.87	3201.2	77.69
59	96.3	45.82	53.0	35.71	19.2	23.45	50.8	61.53	48.8	50.11	02.6	78.62

34°						35°						
T	E	C	M	X	Y	T	E	C	M	X	Y	/
1751.7	261.80	3350.4	250.36	3204.0	979.56	1806.6	278.05	3445.9	265.19	3286.4	1036.2	0
52.6	62.06	52.0	50.60	05.4	80.49	07.5	78.33	47.5	65.44	87.8	37.2	1
53.6	62.33	53.6	50.85	06.7	81.42	08.4	78.61	49.1	65.69	89.1	38.1	2
54.5	62.60	55.2	51.09	08.1	82.35	09.3	78.88	50.6	65.94	90.5	39.1	3
55.4	62.86	56.8	51.33	09.5	83.29	10.2	79.16	52.2	66.19	91.9	40.0	4
56.3	63.13	58.3	51.58	10.9	84.22	11.1	79.43	53.8	66.44	93.2	41.0	5
57.2	63.40	59.9	51.82	12.3	85.15	12.1	79.71	55.4	66.69	94.6	41.9	6
58.1	63.67	61.5	52.07	13.6	86.09	13.0	79.99	57.0	66.94	95.9	42.9	7
59.0	63.93	63.1	52.31	15.0	87.02	13.9	80.26	58.6	67.19	97.3	43.9	8
59.9	64.20	64.7	52.56	16.4	87.96	14.8	80.54	60.2	67.45	98.7	44.8	9
1760.8	264.47	3366.3	252.80	3217.8	988.89	1815.7	280.82	3461.8	267.70	3300.0	1045.8	10
61.8	64.74	67.9	53.05	19.2	89.83	16.6	81.10	63.4	67.95	01.4	46.7	11
62.7	65.01	69.5	53.29	20.5	90.77	17.6	81.37	64.9	68.20	02.8	47.7	12
63.6	65.27	71.1	53.54	21.9	91.70	18.5	81.65	66.5	68.45	04.1	48.7	13
64.5	65.54	72.7	53.78	23.3	92.64	19.4	81.93	68.1	68.71	05.5	49.6	14
65.4	65.81	74.3	54.03	24.7	93.58	20.3	82.20	69.7	68.96	06.8	50.6	15
66.3	66.08	75.9	54.27	26.1	94.52	21.2	82.48	71.3	69.21	08.2	51.5	16
67.2	66.35	77.5	54.52	27.4	95.46	22.1	82.76	72.9	69.46	09.6	52.5	17
68.1	66.62	79.1	54.76	28.8	96.40	23.1	83.04	74.5	69.71	10.9	53.5	18
69.1	66.89	80.6	55.01	30.2	97.34	24.0	83.32	76.1	69.97	12.3	54.4	19
1770.0	267.16	3382.2	255.25	3231.6	998.28	1824.9	283.60	3477.7	270.22	3313.6	1055.4	20
70.9	67.43	83.8	55.50	32.9	99.22	25.8	83.87	79.2	70.47	15.0	56.4	21
71.8	67.70	85.4	55.75	34.3	1000.2	26.7	84.15	80.8	70.73	16.4	57.3	22
72.7	67.97	87.0	55.99	35.7	01.1	27.6	84.43	82.4	70.98	17.7	58.3	23
73.6	68.24	88.6	56.24	37.1	02.0	28.6	84.71	84.0	71.23	19.1	59.3	24
74.5	68.51	90.2	56.49	38.4	03.0	29.5	84.99	85.6	71.49	20.4	60.2	25
75.4	68.78	91.8	56.73	39.8	03.9	30.4	85.27	87.2	71.74	21.8	61.2	26
76.4	69.05	93.4	56.98	41.2	04.9	31.3	85.55	88.8	71.99	23.2	62.2	27
77.3	69.32	95.0	57.23	42.6	05.8	32.2	85.83	90.4	72.25	24.5	63.1	28
78.2	69.59	96.6	57.47	43.9	06.8	33.2	86.11	91.9	72.50	25.9	64.1	29
1779.1	269.86	3398.2	257.72	3245.3	1007.7	1834.1	286.39	3493.5	272.76	3327.2	1065.1	30
80.0	70.13	99.8	57.97	46.7	08.6	35.0	86.67	95.1	73.01	28.6	66.0	31
80.9	70.40	3401.3	58.21	48.1	09.6	35.9	86.95	96.7	73.26	29.9	67.0	32
81.8	70.67	02.9	58.46	49.4	10.5	36.8	87.23	98.3	73.52	31.3	68.0	33
82.8	70.94	04.5	58.71	50.8	11.5	37.8	87.51	99.9	73.77	32.7	68.9	34
83.7	71.21	06.1	58.96	52.1	12.4	38.7	87.79	3501.5	74.03	34.0	69.9	35
84.6	71.49	07.7	59.20	53.5	13.4	39.6	88.07	03.1	74.28	35.4	70.9	36
85.5	71.76	09.3	59.45	54.9	14.3	40.5	88.35	04.6	74.54	36.7	71.8	37
86.4	72.03	10.9	59.70	56.3	15.3	41.4	88.63	06.2	74.79	38.1	72.8	38
87.3	72.30	12.5	59.95	57.7	16.2	42.3	88.92	07.8	75.05	39.4	73.8	39
1788.2	272.58	3414.1	260.20	3259.0	1017.2	1843.3	289.20	3509.4	275.30	3340.8	1074.8	40
89.2	72.85	15.7	60.44	60.4	18.1	44.2	89.48	11.0	75.56	42.1	75.7	41
90.1	73.12	17.3	60.69	61.8	19.1	45.1	89.76	12.6	75.81	43.5	76.7	42
91.0	73.39	18.8	60.94	63.1	20.0	46.0	90.04	14.2	76.07	44.8	77.7	43
91.9	73.67	20.4	61.19	64.5	21.0	46.9	90.32	15.7	76.32	46.2	78.6	44
92.8	73.94	22.0	61.44	65.9	21.9	47.9	90.61	17.3	76.58	47.5	79.6	45
93.7	74.21	23.6	61.69	67.3	22.9	48.8	90.89	18.9	76.84	48.9	80.6	46
94.6	74.49	25.2	61.94	68.6	23.8	49.7	91.17	20.5	77.09	50.3	81.6	47
95.6	74.76	26.8	62.19	70.0	24.8	50.6	91.46	22.1	77.35	51.6	82.5	48
96.5	75.03	28.4	62.44	71.4	25.7	51.5	91.74	23.7	77.60	53.0	83.5	49
1797.4	275.3,	3430.0	262.69	3272.7	1026.7	1852.5	292.02	3525.3	277.86	3354.3	1084.5	50
98.3	75.58	31.6	62.93	74.1	27.6	53.4	92.30	26.8	78.12	55.7	85.5	51
99.2	75.86	33.2	63.19	75.5	28.6	54.3	92.59	28.4	78.37	57.0	86.4	52
1800.1	76.13	34.7	63.43	76.9	29.5	55.2	92.87	30.0	78.63	58.4	87.4	53
01.1	76.40	36.3	63.68	78.2	30.5	56.1	93.16	31.6	78.89	59.7	88.4	54
02.0	76.68	37.9	63.93	79.6	31.4	57.1	93.45	33.2	79.14	61.1	89.4	55
02.9	76.95	39.5	64.18	81.0	32.4	58.0	93.73	34.8	79.40	62.4	90.4	56
03.8	77.23	41.1	64.43	82.4	33.3	58.9	94.02	36.4	79.66	63.8	91.3	57
04.7	77.50	42.7	64.68	83.7	34.3	59.8	94.31	37.9	79.91	65.1	92.3	58
05.6	77.78	44.3	64.93	85.1	35.2	60.8	94.59	39.5	80.17	66.5	93.3	59

	36°						37°					
/	T	E	C	M	X	Y	T	E	C	M	X	Y
0	1961.7	294.86	3541.1	2804.43	3367.8	1094.3	1917.1	312.22	3636.1	2960.9	3448.2	1153.7
1	62.6	95.14	42.7	80.69	69.2	95.2	18.0	12.52	37.7	96.35	49.5	54.8
2	63.5	95.43	44.3	80.94	70.5	96.2	19.0	12.81	39.3	96.62	50.9	55.8
3	64.4	95.72	45.9	81.20	71.8	97.2	19.9	13.10	40.8	96.88	52.2	56.8
4	65.4	96.00	47.5	81.46	73.2	98.2	20.8	13.40	42.4	97.15	53.5	57.8
5	66.3	96.29	49.0	81.72	74.5	99.2	21.7	13.69	44.0	97.41	54.8	58.8
6	67.2	96.57	50.6	81.98	75.9	1100.2	22.7	13.99	45.6	97.68	56.2	59.8
7	68.1	96.86	52.2	82.23	77.2	01.1	23.6	14.28	47.2	97.94	57.5	60.8
8	69.0	97.14	53.8	82.49	78.6	02.1	24.5	14.58	48.7	98.21	58.8	61.8
9	70.0	97.43	55.4	82.75	79.9	03.1	25.5	14.87	50.3	98.47	60.2	62.8
10	1870.9	297.72	3557.0	2783.01	3381.3	1104.1	1926.4	315.17	3651.9	2984.74	3461.5	1163.8
11	71.8	98.00	58.6	83.27	82.6	05.1	27.3	15.47	53.5	99.00	62.8	64.8
12	72.7	98.29	60.1	83.53	84.0	06.1	28.2	15.76	55.1	99.27	64.1	65.8
13	73.7	98.57	61.7	83.79	85.3	07.0	29.2	16.06	56.6	99.53	65.5	66.8
14	74.6	98.86	63.3	84.05	86.7	08.0	30.1	16.35	58.2	99.80	66.8	67.8
15	75.5	99.15	64.9	84.31	88.0	09.0	31.0	16.65	59.8	3000.07	68.1	68.8
16	76.4	99.44	66.5	84.57	89.3	10.0	32.0	16.95	61.4	00.33	69.4	69.8
17	77.4	99.73	68.1	84.83	90.7	11.0	32.9	17.24	62.9	00.60	70.8	70.9
18	78.3	300.01	69.6	85.08	92.0	12.0	33.8	17.54	64.5	00.87	72.1	71.9
19	79.2	00.30	71.2	85.34	93.4	13.0	34.7	17.84	66.1	01.13	73.4	72.9
20	1880.1	300.59	3572.8	2785.60	3394.7	1113.9	1935.7	318.13	3667.7	3001.40	3474.7	1173.9
21	81.0	00.87	74.4	85.86	96.1	14.9	36.6	18.43	69.3	01.67	76.1	74.9
22	82.0	01.16	76.0	86.12	97.4	15.9	37.5	18.73	70.8	01.93	77.4	75.9
23	82.9	01.45	77.6	86.38	98.7	16.9	38.5	19.03	72.4	02.20	78.7	76.9
24	83.8	01.74	79.1	86.64	3400.1	17.9	39.4	19.32	74.0	02.47	80.1	77.9
25	84.7	02.03	80.7	86.90	01.4	18.9	40.3	19.62	75.6	02.73	81.4	78.9
26	85.7	02.32	82.3	87.16	02.8	19.9	41.2	19.92	77.2	03.00	82.7	80.0
27	86.6	02.60	83.9	87.42	04.1	20.9	42.2	20.22	78.7	03.27	84.0	81.0
28	87.5	02.89	85.5	87.68	05.4	21.9	43.1	20.52	80.3	03.54	85.3	82.0
29	88.4	03.18	87.1	87.95	06.8	22.8	44.0	20.81	81.9	03.80	86.7	83.0
30	1889.4	303.47	3588.6	2888.21	3408.1	1123.8	1945.0	321.11	3683.5	3004.07	3488.0	1184.0
31	90.3	03.76	90.2	88.47	09.5	24.8	45.9	21.41	85.0	04.34	89.3	85.0
32	91.2	04.05	91.8	88.73	10.8	25.8	46.8	21.71	86.6	04.61	90.6	86.0
33	92.1	04.34	93.4	88.99	12.1	26.8	47.7	22.01	88.2	04.88	92.0	87.1
34	93.1	04.63	95.0	89.25	13.5	27.8	48.7	22.31	89.8	05.14	93.3	88.1
35	94.0	04.92	96.6	89.51	14.8	28.8	49.6	22.61	91.4	05.41	94.6	89.1
36	94.9	05.21	98.1	89.77	16.2	29.8	50.5	22.91	92.9	05.68	95.9	90.1
37	95.8	05.50	99.7	90.04	17.5	30.8	51.5	23.21	94.5	05.95	97.2	91.1
38	96.7	05.79	3601.3	90.30	18.8	31.8	52.4	23.51	96.1	06.22	98.6	92.1
39	97.7	06.08	02.9	90.56	20.2	32.8	53.3	23.81	97.7	06.49	99.9	93.2
40	1898.6	306.37	3604.5	2890.82	3421.5	1133.8	1954.3	324.11	3699.3	3006.76	3501.2	1194.2
41	99.5	06.66	06.0	91.08	22.8	34.8	55.2	24.41	3700.8	07.03	02.5	95.2
42	1900.4	06.95	07.6	91.35	24.2	35.8	56.1	24.71	02.4	07.29	03.8	96.2
43	01.4	07.25	09.2	91.61	25.5	36.8	57.0	25.01	04.0	07.56	05.2	97.2
44	02.3	07.54	10.8	91.87	26.9	37.7	58.0	25.31	05.6	07.83	06.5	98.3
45	03.2	07.83	12.4	92.13	28.2	38.7	58.9	25.61	07.1	08.10	07.8	99.3
46	04.1	08.12	13.9	92.40	29.5	39.7	59.8	25.91	08.7	08.37	09.1	1200.3
47	05.1	08.41	15.5	92.66	30.9	40.7	60.8	26.21	10.3	08.64	10.4	01.3
48	06.0	08.70	17.1	92.92	32.2	41.7	61.7	26.52	11.9	08.91	11.7	02.3
49	06.9	09.00	18.7	93.19	33.5	42.7	62.6	26.82	13.4	09.18	13.1	03.4
50	1907.9	309.29	3620.3	2893.45	3434.9	1143.7	1963.6	327.12	3715.0	3009.45	3514.4	1204.4
51	08.8	09.58	21.9	93.71	36.2	44.7	64.5	27.42	16.6	09.72	15.7	05.4
52	09.7	09.87	23.4	93.98	37.5	45.7	65.4	27.72	18.2	09.99	17.0	06.4
53	10.6	10.17	25.0	94.24	38.9	46.7	66.4	28.03	19.7	10.26	18.3	07.4
54	11.6	10.46	26.6	94.50	40.2	47.7	67.3	28.33	21.3	10.53	19.6	08.5
55	12.5	10.75	28.2	94.77	41.5	48.7	68.2	28.63	22.9	10.80	21.0	09.5
56	13.4	11.05	29.8	95.03	42.9	49.7	69.1	28.93	24.5	11.07	22.3	10.5
57	14.3	11.34	31.3	95.29	44.2	50.7	70.1	29.24	26.1	11.35	23.6	11.5
58	15.3	11.63	32.9	95.56	45.5	51.7	71.0	29.54	27.6	11.62	24.9	12.6
59	16.2	11.93	34.5	95.82	46.9	52.7	71.9	29.84	29.2	11.89	26.2	13.6

38°						39°						
T	E	C	M	X	Y	T	E	C	M	X	Y	′
1972.9	330.15	3730.8	312.16	3527.5	1214.6	2029.0	348.64	3825.2	328.64	3605.8	1276.9	0
73.8	30.45	32.4	12.43	28.8	15.7	29.9	48.95	26.8	28.92	07.1	77.9	1
74.7	30.75	33.9	12.70	30.2	16.7	30.9	49.27	28.3	29.20	08.4	79.0	2
75.7	31.06	35.5	12.97	31.5	17.7	31.8	49.58	29.9	29.48	09.7	80.0	3
76.6	31.36	37.1	13.25	32.8	18.7	32.7	49.89	31.5	29.76	11.0	81.1	4
77.5	31.67	38.7	13.52	34.1	19.8	33.7	50.21	33.0	30.04	12.3	82.1	5
78.6	31.97	40.2	13.79	35.4	20.8	34.6	50.52	34.6	30.32	13.6	83.2	6
79.4	32.27	41.8	14.06	36.7	21.8	35.5	50.84	36.2	30.59	14.8	84.2	7
80.3	32.58	43.4	14.33	38.0	22.8	36.5	51.15	37.8	30.87	16.1	85.3	8
81.3	32.88	45.0	14.61	39.3	23.9	37.4	51.47	39.3	31.15	17.4	86.3	9
1982.2	333.19	3746.5	314.88	3540.6	1224.9	2038.4	351.78	3840.9	331.43	3618.7	1287.4	10
83.1	33.49	48.1	15.15	42.0	25.9	39.3	52.10	42.5	31.71	20.0	88.4	11
84.1	33.80	49.7	15.42	43.3	27.0	40.2	52.41	44.0	31.99	21.3	89.5	12
85.0	34.11	51.3	15.70	44.6	28.0	41.2	52.72	45.6	32.27	22.6	90.5	13
85.9	34.41	52.8	15.97	45.9	29.0	42.1	53.04	47.2	32.55	23.9	91.6	14
86.9	34.72	54.4	16.24	47.2	30.1	43.1	53.36	48.7	32.83	25.2	92.7	15
87.8	35.02	56.0	16.51	48.5	31.1	44.0	53.67	50.3	33.11	26.5	93.7	16
88.7	35.33	57.6	16.79	49.8	32.1	44.9	53.99	51.9	33.39	27.8	94.8	17
89.7	35.63	59.1	17.06	51.1	33.2	45.9	54.30	53.5	33.67	29.1	95.8	18
90.6	35.94	60.7	17.34	52.4	34.2	46.8	54.62	55.0	33.95	30.3	96.9	19
1991.5	336.25	3762.3	317.61	3553.7	1235.2	2047.8	354.94	3856.6	334.23	3631.6	1297.9	20
92.5	36.55	63.9	17.88	55.0	36.3	48.7	55.25	58.2	34.51	32.9	99.0	21
93.4	36.86	65.4	18.16	56.3	37.3	49.6	55.57	59.7	34.79	34.2	1300.0	22
94.3	37.17	67.0	18.43	57.7	38.3	50.6	55.89	61.3	35.07	35.5	01.1	23
95.3	37.48	68.6	18.70	59.0	39.4	51.5	56.20	62.9	35.35	36.8	02.2	24
96.2	37.78	70.2	18.98	60.3	40.4	52.5	56.52	64.4	35.63	38.1	03.2	25
97.1	38.09	71.7	19.25	61.6	41.4	53.4	56.84	66.0	35.92	39.4	04.3	26
98.1	38.40	73.3	19.53	62.9	42.5	54.3	57.15	67.6	36.20	40.6	05.3	27
99.0	38.71	74.9	19.80	64.2	43.5	55.3	57.47	69.2	36.48	41.9	06.4	28
99.9	39.01	76.5	20.08	65.5	44.5	56.2	57.79	70.7	36.76	43.2	07.4	29
2000.9	339.32	3778.0	320.35	3566.8	1245.6	2057.2	358.11	3872.3	337.04	3644.5	1308.5	30
01.8	39.63	79.6	20.63	68.1	46.6	58.1	58.42	73.9	37.32	45.8	09.6	31
02.8	39.94	81.2	20.90	69.4	47.7	59.0	58.74	75.4	37.60	47.1	10.6	32
03.7	40.25	82.7	21.18	70.7	48.7	60.0	59.06	77.0	37.89	48.4	11.7	33
04.6	40.56	84.3	21.45	72.0	49.7	60.9	59.38	78.6	38.17	49.6	12.8	34
05.6	40.87	85.9	21.73	73.3	50.8	61.9	59.70	80.1	38.45	50.9	13.8	35
06.5	41.17	87.5	22.00	74.6	51.8	62.8	60.02	81.7	38.73	52.2	14.9	36
07.4	41.48	89.0	22.28	75.9	52.9	63.7	60.34	83.3	39.01	53.5	15.9	37
08.4	41.79	90.6	22.55	77.2	53.9	64.7	60.65	84.8	39.30	54.8	17.0	38
09.3	42.10	92.2	22.83	78.5	54.9	65.6	60.97	86.4	39.58	56.1	18.1	39
2010.2	342.41	3793.8	323.10	3579.8	1256.0	2066.6	361.29	3888.0	339.86	3657.4	1319.1	40
11.2	42.72	95.3	23.38	81.1	57.0	67.5	61.61	89.5	40.15	58.6	20.2	41
12.1	43.03	96.9	23.66	82.4	58.1	68.5	61.93	91.1	40.43	59.9	21.3	42
13.0	43.34	98.5	23.93	83.7	59.1	69.4	62.25	92.7	40.71	61.2	22.3	43
14.0	43.65	3800.0	24.21	85.0	60.1	70.3	62.57	94.2	40.99	62.5	23.4	44
14.9	43.96	01.6	24.48	86.3	61.2	71.3	62.89	95.8	41.28	63.8	24.5	45
15.9	44.27	03.2	24.76	87.6	62.2	72.2	63.21	97.4	41.56	65.0	25.5	46
16.8	44.59	04.8	25.04	88.9	63.3	73.2	63.53	98.9	41.84	66.3	26.6	47
17.7	44.90	06.3	25.31	90.2	64.3	74.1	63.85	3900.5	42.13	67.6	27.7	48
18.7	45.21	07.9	25.59	91.5	65.4	75.0	64.18	02.1	42.41	68.9	28.7	49
2019.6	345.52	3809.5	325.87	3592.8	1266.4	2076.0	364.50	3903.6	342.70	3670.2	1329.8	50
20.5	45.83	11.0	26.15	94.1	67.5	76.9	64.82	05.2	42.98	71.4	30.9	51
21.5	46.14	12.6	26.42	95.4	68.5	77.9	65.14	06.8	43.26	72.7	31.9	52
22.4	46.45	14.2	26.70	96.7	69.5	78.8	65.46	08.3	43.55	74.0	33.0	53
23.4	46.77	15.8	26.98	98.0	70.6	79.8	65.78	09.9	43.83	75.3	34.1	54
24.3	47.08	17.3	27.25	99.3	71.6	80.7	66.10	11.5	44.12	76.6	35.1	55
25.2	47.39	18.9	27.53	3600.6	72.7	81.6	66.43	13.0	44.40	77.8	36.2	56
26.2	47.70	20.5	27.81	01.9	73.7	82.6	66.75	14.6	44.69	79.1	37.3	57
27.1	48.02	22.1	28.09	03.2	74.8	83.5	67.07	16.2	44.97	80.4	38.3	58
28.0	48.33	23.6	28.37	04.5	75.8	84.5	67.39	17.7	45.26	81.7	39.4	59

	40°						41°					
I	T	E	C	M	X	Y	T	E	C	M	X	Y
0	2085.4	367.72	3919.3	345.54	3682.9	1340.5	2142.2	397.38	4013.1	362.85	3759.0	1405.4
1	86.4	68.04	20.9	45.83	84.2	41.6	43.2	87.71	14.7	63.14	60.2	06.5
2	87.3	68.36	22.4	46.11	85.5	42.6	44.1	88.04	16.2	63.43	61.5	07.6
3	88.3	68.69	24.0	46.40	86.8	43.7	45.1	88.38	17.8	63.72	62.8	08.7
4	89.2	69.01	25.6	46.68	88.1	44.8	46.0	88.71	19.4	64.01	64.0	09.8
5	90.1	69.33	27.1	46.97	89.3	45.8	47.0	89.04	20.9	64.31	65.3	10.9
6	91.1	69.66	28.7	47.25	90.6	46.9	47.9	89.38	22.5	64.60	66.5	12.0
7	92.0	69.98	30.3	47.54	91.9	48.0	48.9	89.71	24.1	64.89	67.8	13.1
8	93.0	70.30	31.8	47.82	93.2	49.1	49.8	90.04	25.6	65.18	69.0	14.2
9	93.9	70.63	33.4	48.11	94.4	50.1	50.8	90.38	27.2	65.48	70.3	15.3
10	2094.9	370.95	3935.0	348.40	3695.7	1351.2	2151.7	390.71	4028.7	365.77	3771.5	1416.4
11	95.8	71.28	36.5	48.68	97.0	52.3	52.7	91.05	30.3	66.06	72.8	17.5
12	96.8	71.60	38.1	48.97	98.2	53.4	53.6	91.38	31.9	66.36	74.1	18.6
13	97.7	71.93	39.7	49.26	99.5	54.4	54.6	91.72	33.4	66.65	75.3	19.7
14	98.6	72.25	41.2	49.54	3700.8	55.5	55.5	92.05	35.0	66.94	76.6	20.8
15	99.6	72.58	42.8	49.83	02.1	56.6	56.5	92.39	36.5	67.24	77.8	21.9
16	2100.5	72.90	44.4	50.12	03.3	57.7	57.4	92.72	38.1	67.53	79.1	23.0
17	01.5	73.23	45.9	50.40	04.6	58.7	58.4	93.06	39.7	67.82	80.3	24.1
18	02.4	73.55	47.5	50.69	05.9	59.8	59.3	93.39	41.2	68.12	81.6	25.2
19	03.4	73.88	49.1	50.98	07.2	60.9	60.3	93.73	42.8	68.41	82.8	26.3
20	2104.3	374.20	3950.6	351.26	3708.4	1362.0	2161.2	394.06	4044.3	368.71	3784.1	1427.4
21	05.3	74.53	52.2	51.55	09.7	63.1	62.2	94.40	45.9	69.00	85.3	28.5
22	06.2	74.86	53.7	51.84	11.0	64.1	63.1	94.74	47.5	69.29	86.6	29.6
23	07.2	75.18	55.3	52.13	12.2	65.2	64.1	95.07	49.0	69.59	87.8	30.7
24	08.1	75.51	56.9	52.41	13.5	66.3	65.1	95.41	50.6	69.88	89.1	31.8
25	09.0	75.84	58.4	52.70	14.8	67.4	66.0	95.75	52.1	70.18	90.3	32.9
26	10.0	76.16	60.0	52.99	16.0	68.5	67.0	96.08	53.7	70.47	91.6	34.0
27	10.9	76.49	61.6	53.28	17.3	69.5	67.9	96.42	55.3	70.77	92.8	35.1
28	11.9	76.82	63.1	53.57	18.6	70.6	68.9	96.76	56.8	71.06	94.1	36.2
29	12.8	77.15	64.7	53.85	19.8	71.7	69.8	97.09	58.4	71.36	95.3	37.3
30	2113.8	377.47	3966.3	354.14	3721.1	1372.8	2170.8	397.43	4059.9	371.65	3796.6	1438.4
31	14.7	77.80	67.8	54.43	22.4	73.9	71.7	97.77	61.5	71.95	97.8	39.5
32	15.7	78.13	69.4	54.72	23.6	75.0	72.7	98.11	63.0	72.24	99.1	40.6
33	16.6	78.46	71.0	55.01	24.9	76.0	73.6	98.45	64.6	72.54	3800.3	41.7
34	17.6	78.79	72.5	55.30	26.2	77.1	74.6	98.78	66.2	72.83	01.6	42.8
35	18.5	79.11	74.1	55.59	27.4	78.2	75.5	99.12	67.7	73.13	02.8	43.9
36	19.5	79.44	75.6	55.87	28.7	79.3	76.5	99.46	69.3	73.43	04.1	45.0
37	20.4	79.77	77.2	56.16	30.0	80.4	77.4	99.80	70.8	73.72	05.3	46.1
38	21.4	80.10	78.8	56.45	31.2	81.5	78.4	400.14	72.4	74.02	06.6	47.2
39	22.3	80.43	80.3	56.74	32.5	82.5	79.4	00.48	74.0	74.31	07.8	48.4
40	2123.3	380.76	3981.9	357.03	3733.8	1383.6	2180.3	400.82	4075.5	374.61	3809.0	1449.5
41	24.2	81.09	83.5	57.32	35.0	84.7	81.3	01.16	77.1	74.91	10.3	50.6
42	25.1	81.42	85.0	57.61	36.3	85.8	82.2	01.49	78.6	75.20	11.5	51.7
43	26.1	81.75	86.6	57.90	37.6	86.9	83.2	01.83	80.2	75.50	12.8	52.8
44	27.0	82.08	88.1	58.19	38.8	88.0	84.1	02.17	81.7	75.80	14.0	53.9
45	28.0	82.41	89.7	58.48	40.1	89.1	85.1	02.52	83.3	76.09	15.3	55.0
46	28.9	82.74	91.3	58.77	41.3	90.2	86.0	02.86	84.9	76.39	16.5	56.1
47	29.9	83.07	92.8	59.06	42.6	91.2	87.0	03.20	86.4	76.69	17.8	57.2
48	30.8	83.40	94.4	59.35	43.9	92.3	87.9	03.54	88.0	76.98	19.0	58.3
49	31.8	83.73	96.0	59.64	45.1	93.4	88.9	03.88	89.5	77.28	20.2	59.4
50	2132.7	384.06	3997.5	359.93	3746.4	1394.5	2189.9	404.22	4091.1	377.58	3821.5	1460.6
51	33.7	84.39	99.1	60.22	47.7	95.6	90.8	04.56	92.6	77.88	22.7	61.7
52	34.6	84.72	4000.6	60.51	48.9	96.7	91.8	04.90	94.2	78.18	24.0	62.8
53	35.6	85.05	02.2	60.81	50.2	97.8	92.7	05.24	95.8	78.47	25.2	63.9
54	36.5	85.39	03.8	61.10	51.4	98.9	93.7	05.58	97.3	78.77	26.4	65.0
55	37.5	85.72	05.3	61.39	52.7	1400.0	94.6	05.92	98.9	79.07	27.7	66.1
56	38.4	86.05	06.9	61.68	54.0	01.1	95.6	06.27	4100.4	79.37	28.9	67.2
57	39.4	86.38	08.4	61.97	55.2	02.1	96.5	06.61	02.0	79.67	30.2	68.3
58	40.3	86.71	10.0	62.26	56.5	03.2	97.5	06.95	03.5	79.96	31.4	69.5
59	41.3	87.05	11.6	62.55	57.7	04.3	98.5	07.29	05.1	80.26	32.6	70.6

42°						43°						
T	E	C	M	X	Y	T	E	C	M	X	Y	I
2199.4	407.64	4106.6	380.56	3833.9	1471.7	2257.0	428.50	4199.8	398.68	3907.6	1539.2	0
2200.4	07.98	08.2	80.86	35.1	72.8	57.9	28.85	4201.4	98.99	08.8	40.4	1
01.3	08.32	09.8	81.16	36.4	73.9	58.9	29.21	02.9	99.29	10.0	41.5	2
02.3	08.66	11.3	81.46	37.6	75.0	59.9	29.56	04.5	99.60	11.3	42.7	3
03.2	09.01	12.9	81.76	38.8	76.2	60.8	29.91	06.0	99.91	12.5	43.8	4
04.2	09.35	14.4	82.06	40.1	77.3	61.8	30.27	07.6	400.21	13.7	44.9	5
05.1	09.69	16.0	82.35	41.3	78.4	62.7	30.62	09.2	00.52	14.9	46.1	6
06.1	10.04	17.5	82.65	42.5	79.5	63.7	30.97	10.7	00.82	16.1	47.2	7
07.1	10.38	19.1	82.95	43.8	80.6	64.7	31.33	12.3	01.13	17.4	48.4	8
08.0	10.73	20.6	83.25	45.0	81.7	65.6	31.68	13.8	01.44	18.6	49.5	9
2209.0	411.07	4122.2	383.55	3846.3	1482.9	2266.6	432.04	4215.4	401.74	3919.8	1550.6	10
09.9	11.42	23.8	83.85	47.5	84.0	67.6	32.39	16.9	02.05	21.0	51.8	11
10.9	11.76	25.3	84.15	48.7	85.1	68.5	32.74	18.4	02.36	22.2	52.9	12
11.8	12.10	26.9	84.45	50.0	86.2	69.5	33.10	20.0	02.66	23.4	54.1	13
12.8	12.45	28.4	84.75	51.2	87.3	70.5	33.46	21.5	02.97	24.6	55.2	14
13.8	12.79	30.0	85.05	52.4	88.5	71.4	33.81	23.1	03.28	25.9	56.3	15
14.7	13.14	31.5	85.35	53.7	89.6	72.4	34.17	24.6	03.58	27.1	57.5	16
15.7	13.49	33.1	85.65	54.9	90.7	73.4	34.52	26.2	03.89	28.3	58.6	17
16.6	13.83	34.6	85.95	56.1	91.8	74.3	34.88	27.7	04.20	29.5	59.8	18
17.6	14.18	36.2	86.26	57.4	92.9	75.3	35.23	29.3	04.51	30.7	60.9	19
2218.6	414.52	4137.7	386.56	3858.6	1494.1	2276.2	435.59	4230.8	404.81	3931.9	1562.1	20
19.5	14.87	39.3	86.86	59.8	95.2	77.2	35.95	32.4	05.12	33.1	63.2	21
20.5	15.21	40.9	87.16	61.1	96.3	78.2	36.30	33.9	05.43	34.3	64.3	22
21.4	15.56	42.4	87.46	62.3	97.4	79.1	36.66	35.5	05.74	35.6	65.5	23
22.4	15.91	44.0	87.76	63.5	98.6	80.1	37.02	37.0	06.05	36.8	66.6	24
23.3	16.25	45.5	88.06	64.7	99.7	81.1	37.37	38.6	06.35	38.0	67.8	25
24.3	16.60	47.1	88.36	66.0	1500.8	82.0	37.73	40.1	06.66	39.2	68.9	26
25.3	16.95	48.6	88.67	67.2	01.9	83.0	38.09	41.7	06.97	40.4	70.1	27
26.2	17.30	50.2	88.97	68.4	03.1	84.0	38.44	43.2	07.28	41.6	71.2	28
27.2	17.64	51.7	89.27	69.7	04.2	84.9	38.80	44.8	07.59	42.8	72.4	29
2228.1	417.99	4153.3	389.57	3870.9	1505.3	2285.9	439.16	4246.3	407.90	3944.0	1573.5	30
29.1	18.34	54.8	89.87	72.1	06.4	86.9	39.52	47.9	08.21	45.2	74.7	31
30.1	18.69	56.4	90.18	73.4	07.6	87.8	39.88	49.4	08.51	46.4	75.8	32
31.0	19.03	57.9	90.48	74.6	08.7	88.8	40.24	51.0	08.82	47.6	77.0	33
32.0	19.38	59.5	90.78	75.8	09.8	89.8	40.59	52.5	09.13	48.9	78.1	34
32.9	19.73	61.1	91.08	77.0	10.9	90.7	40.95	54.1	09.44	50.1	79.3	35
33.9	20.08	62.6	91.38	78.3	12.1	91.7	41.31	55.6	09.75	51.3	80.4	36
34.9	20.43	64.2	91.69	79.5	13.2	92.7	41.67	57.2	10.06	52.5	81.5	37
35.8	20.78	65.7	91.99	80.7	14.3	93.6	42.03	58.7	10.37	53.7	82.7	38
36.8	21.13	67.3	92.29	81.9	15.5	94.6	42.39	60.3	10.68	54.9	83.8	39
2237.7	421.48	4168.8	392.60	3883.2	1516.6	2295.6	442.75	4261.8	410.99	3956.1	1585.0	40
38.7	21.82	70.4	92.90	84.4	17.7	96.5	43.11	63.4	11.30	57.3	86.1	41
39.7	22.17	71.9	93.20	85.6	18.8	97.5	43.47	64.9	11.61	58.5	87.3	42
40.6	22.52	73.5	93.51	86.8	20.0	98.5	43.83	66.4	11.92	59.7	88.4	43
41.6	22.88	75.0	93.81	88.1	21.1	99.4	44.19	68.0	12.23	60.9	89.6	44
42.5	23.23	76.6	94.11	89.3	22.2	2300.4	44.55	69.5	12.54	62.1	90.8	45
43.5	23.58	78.1	94.42	90.5	23.4	01.4	44.91	71.1	12.85	63.3	91.9	46
44.5	23.93	79.7	94.72	91.7	24.5	02.3	45.27	72.6	13.16	64.5	93.1	47
45.4	24.28	81.2	95.03	93.0	25.6	03.3	45.63	74.2	13.47	65.7	94.2	48
46.4	24.63	82.8	95.33	94.2	26.8	04.3	45.99	75.7	13.78	66.9	95.4	49
2247.3	424.98	4184.3	395.63	3895.4	1527.9	2305.2	446.35	4277.3	414.10	3968.1	1596.5	50
48.3	25.33	85.9	95.94	96.6	29.0	06.2	46.72	78.8	14.41	69.3	97.7	51
49.3	25.68	87.4	96.24	97.9	30.2	07.2	47.08	80.4	14.72	70.5	98.8	52
50.2	26.03	89.0	96.55	99.1	31.3	08.1	47.44	81.9	15.03	71.7	1600.0	53
51.2	26.39	90.5	96.85	3900.3	32.4	09.1	47.80	83.5	15.34	72.9	01.1	54
52.2	26.74	92.1	97.16	01.5	33.6	10.1	48.16	85.0	15.65	74.1	02.3	55
53.1	27.09	93.6	97.46	02.7	34.7	11.1	48.53	86.5	15.96	75.3	03.5	56
54.1	27.44	95.2	97.77	04.0	35.8	12.0	48.89	88.1	16.28	76.5	04.6	57
55.0	27.79	96.7	98.07	05.2	37.0	13.0	49.25	89.6	16.59	77.7	05.8	58
56.0	28.15	98.3	98.38	06.4	38.1	14.0	49.61	91.2	16.90	78.9	06.9	59

	44°						45°					
I	T	E	C	M	X	Y	T	E	C	M	X	Y
0	2314.9	449.98	4292.7	417.21	3980.1	1608.1	2373.3	472.08	4395.3	436.14	4051.5	1678.2
1	15.9	50.34	98.3	17.52	81.3	09.2	74.3	72.45	96.8	36.46	52.7	79.4
2	16.9	50.70	95.8	17.83	82.5	10.4	75.3	72.83	88.4	36.78	53.8	80.5
3	17.8	51.07	97.4	18.15	83.7	11.6	76.2	73.20	89.9	37.10	55.0	81.7
4	18.8	51.43	98.9	18.46	84.9	12.7	77.2	73.57	91.4	37.42	56.2	82.9
5	19.8	51.79	4300.5	18.77	86.1	13.9	78.2	73.95	93.0	37.74	57.4	84.1
6	20.7	52.16	02.0	19.09	87.3	15.0	79.2	74.32	94.5	38.06	58.5	85.3
7	21.7	52.52	03.5	19.40	88.5	16.2	80.1	74.70	96.1	38.38	59.7	86.4
8	22.7	52.89	05.1	19.71	89.7	17.4	81.1	75.07	97.6	38.70	60.9	87.6
9	23.7	53.25	06.6	20.03	90.9	18.5	82.1	75.45	99.1	39.02	62.1	88.8
10	2324.6	453.62	4308.2	420.34	3992.1	1619.7	2383.1	475.82	4400.7	439.34	4063.2	1690.0
11	25.6	53.98	09.7	20.65	93.3	20.8	84.0	76.20	02.2	39.66	64.4	91.2
12	26.6	54.35	11.3	20.97	94.5	22.0	85.0	76.57	03.8	39.98	65.6	92.3
13	27.5	54.71	12.8	21.28	95.7	23.2	86.0	76.95	05.3	40.30	66.8	93.5
14	28.5	55.08	14.4	21.59	96.9	24.3	87.0	77.33	06.8	40.62	67.9	94.7
15	29.5	55.44	15.9	21.91	98.1	25.5	88.0	77.70	08.4	40.94	69.1	95.9
16	30.5	55.81	17.4	22.22	99.3	26.7	88.9	78.08	09.9	41.26	70.3	97.1
17	31.4	56.18	19.0	22.53	4000.5	27.8	89.9	78.46	11.4	41.58	71.5	98.3
18	32.4	56.54	20.5	22.85	01.7	29.0	90.9	78.83	13.0	41.90	72.6	99.4
19	33.4	56.91	22.1	23.16	02.9	30.1	91.9	79.21	14.5	42.22	73.8	1700.6
20	2334.3	457.27	4323.6	423.48	4004.1	1631.3	2392.8	479.59	4416.1	442.54	4075.0	1701.8
21	35.3	57.64	25.2	23.79	05.3	32.5	93.8	79.96	17.6	42.87	76.1	03.0
22	36.3	58.01	26.7	24.11	06.4	33.6	94.8	80.34	19.1	43.19	77.3	04.2
23	37.3	58.37	28.2	24.42	07.6	34.8	95.8	80.72	20.7	43.51	78.5	05.4
24	38.2	58.74	29.8	24.74	08.8	36.0	96.8	81.10	22.2	43.83	79.7	06.6
25	39.2	59.11	31.3	25.05	10.0	37.1	97.7	81.47	23.8	44.15	80.8	07.7
26	40.2	59.48	32.9	25.37	11.2	38.3	98.7	81.85	25.3	44.47	82.0	08.9
27	41.1	59.84	34.4	25.68	12.4	39.5	99.7	82.23	26.8	44.79	83.2	10.1
28	42.1	60.21	36.0	26.00	13.6	40.6	2400.7	82.61	28.4	45.12	84.3	11.3
29	43.1	60.58	37.5	26.31	14.8	41.8	01.7	82.99	29.9	45.44	85.5	12.5
30	2344.1	460.95	4339.0	426.63	4016.0	1643.0	2402.6	483.37	4431.4	445.76	4086.7	1713.7
31	45.0	61.32	40.6	26.94	17.2	44.1	03.6	83.75	33.0	46.08	87.8	14.9
32	46.0	61.69	42.1	27.26	18.3	45.3	04.6	84.12	34.5	46.41	89.0	16.1
33	47.0	62.05	43.7	27.57	19.5	46.5	05.6	84.50	36.0	46.73	90.2	17.3
34	48.0	62.42	45.2	27.89	20.7	47.7	06.6	84.88	37.6	47.05	91.3	18.4
35	48.9	62.79	46.8	28.21	21.9	48.8	07.5	85.26	39.1	47.37	92.5	19.6
36	49.9	63.16	48.3	28.52	23.1	50.0	08.5	85.64	40.7	47.70	93.7	20.8
37	50.9	63.53	49.8	28.84	24.3	51.2	09.5	86.02	42.2	48.02	94.8	22.0
38	51.8	63.90	51.4	29.15	25.5	52.3	10.5	86.40	43.7	48.34	96.0	23.2
39	52.8	64.27	52.9	29.47	26.7	53.5	11.5	86.78	45.3	48.67	97.2	24.4
40	2353.8	464.64	4354.5	429.79	4027.8	1654.7	2412.4	487.17	4446.8	448.99	4098.3	1725.6
41	54.8	65.01	56.0	30.11	29.0	55.8	13.4	87.55	48.3	49.31	99.5	26.8
42	55.7	65.38	57.6	30.42	30.2	57.0	14.4	87.93	49.9	49.64	4100.7	28.0
43	56.7	65.75	59.1	30.74	31.4	58.2	15.4	88.31	51.4	49.96	01.8	29.2
44	57.7	66.12	60.6	31.06	32.6	59.4	16.4	88.69	52.9	50.28	03.0	30.4
45	58.7	66.49	62.2	31.37	33.8	60.5	17.4	89.07	54.5	50.61	04.2	31.6
46	59.6	66.86	63.7	31.69	34.9	61.7	18.3	89.45	56.0	50.93	05.3	32.8
47	60.6	67.24	65.3	32.01	36.1	62.9	19.3	89.83	57.6	51.26	06.5	34.0
48	61.6	67.61	66.8	32.32	37.3	64.1	20.3	90.22	59.1	51.58	07.6	35.1
49	62.6	67.98	68.3	32.64	38.5	65.2	21.3	90.60	60.6	51.90	08.8	36.3
50	2363.5	468.35	4369.9	432.96	4039.7	1666.4	2422.3	490.98	4462.2	452.23	4110.0	1737.5
51	64.5	68.72	71.4	33.28	40.9	67.6	23.2	91.36	63.7	52.55	11.1	38.7
52	65.5	69.10	73.0	33.60	42.0	68.8	24.2	91.75	65.2	52.88	12.3	39.9
53	66.5	69.47	74.5	33.91	43.2	69.9	25.2	92.13	66.8	53.20	13.5	41.1
54	67.4	69.84	76.0	34.23	44.4	71.1	26.2	92.51	68.3	53.53	14.6	42.3
55	68.4	70.21	77.6	34.55	45.6	72.3	27.2	92.90	69.8	53.85	15.8	43.5
56	69.4	70.58	79.1	34.87	46.8	73.5	28.2	93.28	71.4	54.18	16.9	44.7
57	70.4	70.96	80.7	35.19	47.9	74.6	29.1	93.66	72.9	54.50	18.1	45.9
58	71.3	71.33	82.2	35.51	49.1	75.8	30.1	94.05	74.4	54.83	19.2	47.1
59	72.3	71.70	83.7	35.82	50.3	77.0	31.1	94.43	76.0	55.15	20.4	48.3

46°						47°						
T	E	C	M	X	Y	T	E	C	M	X	Y	′
2432.1	494.82	4477.5	4554.8	4121.6	1749.5	2491.3	518.20	4569.4	4752.2	4190.4	1822.0	0
33.1	95.20	79.0	55.80	22.7	50.7	92.3	18.59	70.9	75.55	91.5	23.3	1
34.1	95.58	80.6	56.13	23.9	51.9	93.3	18.99	72.4	76.88	92.7	24.5	2
35.0	95.97	82.1	56.46	25.0	53.1	94.3	19.38	74.0	76.21	93.8	25.7	3
36.0	96.35	83.6	56.78	26.2	54.3	95.3	19.78	75.5	76.55	94.9	26.9	4
37.0	96.74	85.2	57.11	27.3	55.5	96.3	20.17	77.0	76.88	96.1	28.1	5
38.0	97.12	86.7	57.43	28.5	56.7	97.3	20.57	78.6	77.21	97.2	29.4	6
39.0	97.51	88.2	57.76	29.7	57.9	98.3	20.97	80.1	77.55	98.3	30.6	7
40.0	97.89	89.8	58.09	30.8	59.1	99.3	21.36	81.6	77.88	99.5	31.8	8
40.9	98.28	91.3	58.41	32.0	60.3	2500.2	21.76	83.1	78.21	4200.6	33.0	9
2441.9	498.67	4492.8	4558.74	4133.1	1761.5	2501.2	522.16	4584.7	4778.55	4201.7	1834.2	10
42.9	99.05	94.4	59.07	34.3	62.7	02.2	22.55	86.2	78.88	02.9	35.5	11
43.9	99.44	95.9	59.39	35.4	63.9	03.2	22.95	87.7	79.21	04.0	36.7	12
44.9	99.83	97.4	59.72	36.6	65.1	04.2	23.35	89.2	79.55	05.1	37.9	13
45.9	500.21	98.0	60.05	37.7	66.3	05.2	23.75	90.8	79.88	06.3	39.1	14
46.9	00.60	4500.5	60.38	38.9	67.5	06.2	24.14	92.3	80.21	07.4	40.4	15
47.8	00.99	02.0	60.70	40.0	68.7	07.2	24.54	93.8	80.55	08.5	41.6	16
48.8	01.37	03.6	61.03	41.2	69.9	08.2	24.94	95.4	80.88	09.7	42.8	17
49.8	01.76	05.1	61.36	42.3	71.1	09.2	25.34	96.9	81.22	10.8	44.0	18
50.8	02.15	06.6	61.69	43.5	72.3	10.2	25.74	98.4	81.55	11.9	45.3	19
2451.8	502.54	4508.2	4624.01	4144.6	1773.5	2511.2	526.13	4599.9	4881.88	4213.1	1846.5	20
52.8	02.92	09.7	62.34	45.8	74.8	12.2	26.53	4601.5	82.22	14.2	47.7	21
53.8	03.31	11.2	62.67	46.9	76.0	13.2	26.93	03.0	82.55	15.3	48.9	22
54.7	03.70	12.8	63.00	48.1	77.2	14.1	27.33	04.5	82.89	16.5	50.2	23
55.7	04.09	14.3	63.33	49.2	78.4	15.1	27.73	06.0	83.22	17.6	51.4	24
56.7	04.48	15.8	63.65	50.4	79.6	16.1	28.13	07.6	83.56	18.7	52.6	25
57.7	04.87	17.4	63.98	51.5	80.8	17.1	28.53	09.1	83.89	19.8	53.8	26
58.7	05.26	18.9	64.31	52.7	82.0	18.1	28.93	10.6	84.23	21.0	55.1	27
59.7	05.65	20.4	64.64	53.8	83.2	19.1	29.33	12.1	84.56	22.1	56.3	28
60.7	06.03	22.0	64.97	55.0	84.4	20.1	29.73	13.7	84.90	23.2	57.5	29
2461.7	506.42	4523.5	4653.30	4156.1	1785.6	2521.1	530.13	4615.2	4885.24	4224.3	1858.8	30
62.6	06.81	25.0	65.63	57.3	86.8	22.1	30.53	16.7	85.57	25.5	60.0	31
63.6	07.20	26.6	65.96	58.4	88.0	23.1	30.93	18.2	85.91	26.6	61.2	32
64.6	07.59	28.1	66.29	59.6	89.2	24.1	31.33	19.8	86.24	27.7	62.4	33
65.6	07.98	29.6	66.62	60.7	90.5	25.1	31.74	21.3	86.58	28.8	63.7	34
66.6	08.37	31.1	66.94	61.9	91.7	26.1	32.14	22.8	86.91	30.0	64.9	35
67.6	08.76	32.7	67.27	63.0	92.9	27.1	32.54	24.3	87.25	31.1	66.1	36
68.6	09.16	34.2	67.60	64.2	94.1	28.1	32.94	25.9	87.59	32.2	67.4	37
69.6	09.55	35.7	67.93	65.3	95.3	29.1	33.34	27.4	87.92	33.3	68.6	38
70.5	09.94	37.3	68.26	66.5	96.5	30.1	33.74	28.9	88.26	34.5	69.8	39
2471.5	510.33	4538.8	4685.59	4167.6	1797.7	2531.1	534.15	4630.4	4888.60	4235.6	1871.1	40
72.5	10.72	40.3	68.92	68.7	98.9	32.1	34.55	32.0	88.93	36.7	72.3	41
73.5	11.11	41.9	69.25	69.9	1800.2	33.1	34.95	33.5	89.27	37.8	73.5	42
74.5	11.51	43.4	69.58	71.0	01.4	34.1	35.36	35.0	89.61	39.0	74.8	43
75.5	11.90	44.9	69.91	72.2	02.6	35.0	35.76	36.5	89.94	40.1	76.0	44
76.5	12.29	46.4	70.24	73.3	03.8	36.0	36.16	38.1	90.28	41.2	77.2	45
77.5	12.68	48.0	70.58	74.5	05.0	37.0	36.56	39.6	90.62	42.3	78.5	46
78.5	13.07	49.5	70.91	75.6	06.2	38.0	36.97	41.1	90.96	43.4	79.7	47
79.4	13.47	51.0	71.24	76.7	07.4	39.0	37.37	42.6	91.29	44.6	80.9	48
80.4	13.86	52.6	71.57	77.9	08.6	40.0	37.78	44.2	91.63	45.7	82.2	49
2481.4	514.25	4554.1	4717.90	4179.0	1809.9	2541.0	538.18	4645.7	4931.97	4246.8	1883.4	50
82.4	14.65	55.6	72.23	80.2	11.1	42.0	38.58	47.2	92.31	47.9	84.6	51
83.4	15.04	57.2	72.56	81.3	12.3	43.0	38.99	48.7	92.65	49.0	85.9	52
84.4	15.43	58.7	72.89	82.4	13.5	44.0	39.39	50.3	92.98	50.1	87.1	53
85.4	15.83	60.2	73.23	83.6	14.7	45.0	39.80	51.8	93.32	51.3	88.3	54
86.4	16.22	61.7	73.56	84.7	15.9	46.0	40.20	53.3	93.66	52.4	89.6	55
87.4	16.62	63.3	73.89	85.9	17.2	47.0	40.61	54.8	94.00	53.5	90.8	56
88.4	17.01	64.8	74.22	87.0	18.4	48.0	41.02	56.3	94.34	54.6	92.1	57
89.3	17.41	66.3	74.55	88.1	19.6	49.0	41.42	57.9	94.68	55.7	93.3	58
90.3	17.80	67.9	74.88	89.3	20.8	50.0	41.83	59.4	95.02	56.8	94.5	59

	48°						49°					
′	T	E	C	M	X	Y	T	E	C	M	X	Y
0	2551.0	542.23	46609	495.35	42580	1895.8	2611.2	566.94	4752.1	515.89	4324.2	1970.7
1	52.0	42.64	62.4	95.69	59.1	97.0	12.2	67.35	53.6	16.24	25.3	71.9
2	53.0	43.05	64.0	96.03	60.2	98.2	13.2	67.77	55.1	16.58	26.4	73.2
3	54.0	43.45	65.5	96.37	61.3	99.5	14.2	68.19	56.6	16.93	27.5	74.4
4	55.0	43.86	67.0	96.71	62.4	1900.7	15.2	68.61	58.2	17.27	28.6	75.7
5	56.0	44.27	68.5	97.05	63.5	02.0	16.2	69.03	59.7	17.62	29.7	77.0
6	57.0	44.67	70.1	97.39	64.6	03.2	17.2	69.44	61.2	17.97	30.8	78.2
7	58.0	45.08	71.6	97.73	65.8	04.4	18.2	69.86	62.7	18.31	31.9	79.5
8	59.0	45.49	73.1	98.07	66.9	05.7	19.2	70.28	64.2	18.66	33.0	80.7
9	60.0	45.90	74.6	98.41	68.0	06.9	20.2	70.70	65.7	19.01	34.0	82.0
10	2561.0	546.30	4676.1	498.75	4269.1	1908.2	2621.2	571.12	4767.3	519.35	4335.1	1983.3
11	62.0	46.71	77.7	99.09	70.2	09.4	22.2	71.54	68.8	19.70	36.2	84.5
12	63.0	47.12	79.2	99.43	71.3	10.7	23.2	71.96	70.3	20.05	37.3	85.8
13	64.0	47.53	80.7	99.77	72.4	11.9	24.2	72.38	71.8	20.39	38.4	87.0
14	65.0	47.94	82.2	500.11	73.5	13.1	25.3	72.80	73.3	20.74	39.5	88.3
15	66.0	48.35	83.7	00.45	74.6	14.4	26.3	73.22	74.8	21.09	40.6	89.6
16	67.0	48.75	85.3	00.79	75.8	15.6	27.3	73.64	76.3	21.43	41.7	90.8
17	68.0	49.16	86.8	01.13	76.9	16.9	28.3	74.06	77.9	21.78	42.8	92.1
18	69.0	49.57	88.3	01.47	78.0	18.1	29.3	74.48	79.4	22.13	43.8	93.4
19	70.0	49.98	89.8	01.81	79.1	19.4	30.3	74.90	80.9	22.48	44.9	94.6
20	2571.0	550.39	4691.3	502.16	4280.2	1920.6	2631.3	575.32	4782.4	522.82	4346.0	1995.9
21	72.0	50.80	92.9	02.50	81.3	21.8	32.3	75.74	83.9	23.17	47.1	97.1
22	73.0	51.21	94.4	02.84	82.4	23.1	33.3	76.16	85.4	23.52	48.2	98.4
23	74.0	51.62	95.9	03.18	83.5	24.3	34.3	76.59	87.0	23.87	49.3	99.7
24	75.0	52.03	97.4	03.52	84.6	25.6	35.3	77.01	88.5	24.22	50.4	2000.9
25	76.0	52.44	99.0	03.86	85.7	26.8	36.4	77.43	90.0	24.56	51.4	02.2
26	77.0	52.85	4700.5	04.20	86.8	28.1	37.4	77.85	91.5	24.91	52.5	03.5
27	78.0	53.27	02.0	04.55	87.9	29.3	38.4	78.27	93.0	25.26	53.6	04.7
28	79.0	53.68	03.5	04.89	89.0	30.6	39.4	78.70	94.5	25.61	54.7	06.0
29	80.0	54.09	05.0	05.23	90.1	31.8	40.4	79.12	96.0	25.96	55.8	07.3
30	2581.0	554.50	4706.6	505.57	4291.2	1933.1	2641.4	579.54	4797.5	526.31	4356.9	2008.5
31	82.0	54.91	08.1	05.91	92.4	34.3	42.4	79.97	99.1	26.66	57.9	09.8
32	83.0	55.32	09.6	06.26	93.5	35.6	43.4	80.39	4800.6	27.01	59.0	11.1
33	84.0	55.74	11.1	06.60	94.6	36.8	44.4	80.81	02.1	27.35	60.1	12.3
34	85.0	56.15	12.6	06.94	95.7	38.1	45.4	81.24	03.6	27.70	61.2	13.6
35	86.0	56.56	14.1	07.29	96.8	39.3	46.5	81.66	05.1	28.05	62.3	14.9
36	87.0	56.97	15.7	07.63	97.9	40.6	47.5	82.08	06.6	28.40	63.3	16.2
37	88.0	57.39	17.2	07.97	99.0	41.8	48.5	82.51	08.1	28.75	64.4	17.4
38	89.0	57.80	18.7	08.31	4300.1	43.1	49.5	82.93	09.7	29.10	65.5	18.7
39	90.0	58.21	20.2	08.66	01.2	44.3	50.5	83.36	11.2	29.45	66.6	20.0
40	2591.1	558.63	4721.7	509.00	4302.3	1945.6	2651.5	583.78	4812.7	529.80	4367.7	2021.2
41	92.1	59.04	23.3	09.34	03.4	46.8	52.5	84.21	14.2	30.15	68.7	22.5
42	93.1	59.45	24.8	09.69	04.5	48.1	53.5	84.63	15.7	30.50	69.8	23.8
43	94.1	59.87	26.3	10.03	05.6	49.3	54.6	85.06	17.2	30.85	70.9	25.0
44	95.1	60.28	27.8	10.37	06.7	50.6	55.6	85.48	18.7	31.20	72.0	26.3
45	96.1	60.70	29.3	10.72	07.8	51.8	56.6	85.91	20.2	31.55	73.1	27.6
46	97.1	61.11	30.9	11.06	08.9	53.1	57.6	86.33	21.8	31.90	74.1	28.9
47	98.1	61.53	32.4	11.41	10.0	54.3	58.6	86.76	23.3	32.25	75.2	30.1
48	99.1	61.94	33.9	11.75	11.1	55.6	59.6	87.19	24.8	32.60	76.3	31.4
49	2600.1	62.36	35.4	12.10	12.2	56.8	60.6	87.61	26.3	32.96	77.4	32.7
50	2601.1	562.77	4736.9	512.44	4313.3	1958.1	2661.6	588.04	4827.8	533.31	4378.4	2033.9
51	02.1	63.19	38.4	12.78	14.4	59.4	62.7	88.47	29.3	33.66	79.5	35.2
52	03.1	63.60	40.0	13.13	15.5	60.6	63.7	88.90	30.8	34.01	80.6	36.5
53	04.1	64.02	41.5	13.47	16.6	61.9	64.7	89.32	32.3	34.36	81.7	37.8
54	05.1	64.44	43.0	13.82	17.7	63.1	65.7	89.75	33.8	34.71	82.7	39.0
55	06.1	64.85	44.5	14.16	18.8	64.4	66.7	90.18	35.4	35.06	83.8	40.3
56	07.1	65.27	46.0	14.51	19.8	65.6	67.7	90.61	36.9	35.42	84.9	41.6
57	08.1	65.69	47.5	14.85	20.9	66.9	68.7	91.03	38.4	35.77	86.0	42.9
58	09.1	66.10	49.1	15.20	22.0	68.1	69.8	91.46	39.9	36.12	87.0	44.1
59	10.1	66.52	50.6	15.54	23.1	69.4	70.8	91.89	41.4	36.47	88.1	45.4

50°				51°				52°				
T	E	C	M	T	E	C	M	T	E	C	M	I
2671.8	592.32	4842.9	536.82	2732.9	618.39	4933.4	558.15	2794.5	645.17	5023.4	579.87	0
72.8	92.75	44.4	37.18	33.9	18.83	34.9	58.51	95.6	45.62	24.9	80.24	1
73.8	93.18	45.9	37.53	34.9	19.27	36.4	58.87	96.6	46.08	26.4	80.61	2
74.8	93.61	47.4	37.88	36.0	19.72	37.9	59.23	97.6	46.53	27.9	80.97	3
75.8	94.04	49.0	38.23	37.0	20.16	39.4	59.59	98.7	46.98	29.4	81.34	4
76.9	94.47	50.5	38.59	38.0	20.60	40.9	59.95	99.7	47.43	30.9	81.70	5
77.9	94.90	52.0	38.94	39.0	21.04	42.4	60.31	2800.7	47.89	32.4	82.07	6
78.9	95.33	53.5	39.29	40.1	21.48	43.9	60.67	01.8	48.34	33.9	82.43	7
79.9	95.76	55.0	39.64	41.1	21.92	45.4	61.03	02.8	48.79	35.4	82.80	8
80.9	96.19	56.5	40.00	42.1	22.36	46.9	61.39	03.8	49.25	36.9	83.17	9
2681.9	596.62	4858.0	540.35	2743.1	622.81	4948.4	561.75	2804.9	649.70	5038.4	583.53	10
82.9	97.05	59.5	40.70	44.2	23.25	49.9	62.11	05.9	50.16	39.9	83.90	11
84.0	97.48	61.0	41.06	45.2	23.69	51.4	62.47	06.9	50.61	41.4	84.27	12
85.0	97.91	62.5	41.41	46.2	24.13	52.9	62.83	08.0	51.07	42.9	84.63	13
86.0	98.34	64.0	41.76	47.2	24.58	54.4	63.19	09.0	51.52	44.4	85.00	14
87.0	98.77	65.6	42.12	48.3	25.02	55.9	63.55	10.0	51.98	45.9	85.37	15
88.0	99.20	67.1	42.47	49.3	25.46	57.4	63.91	11.1	52.43	47.4	85.73	16
89.0	99.64	68.6	42.83	50.3	25.91	58.9	64.27	12.1	52.89	48.9	86.10	17
90.1	600.07	70.1	43.18	51.3	26.35	60.4	64.63	13.1	53.34	50.4	86.47	18
91.1	00.50	71.6	43.53	52.4	26.80	61.9	64.99	14.2	53.80	51.9	86.84	19
2692.1	600.93	4873.1	543.89	2753.4	627.24	4963.4	565.35	2815.2	654.25	5053.4	587.20	20
93.1	01.37	74.6	44.24	54.4	27.68	64.9	65.71	16.2	54.71	54.9	87.57	21
94.1	01.80	76.1	44.60	55.4	28.13	66.4	66.07	17.3	55.17	56.4	87.94	22
95.2	02.23	77.6	44.95	56.5	28.57	67.9	66.43	18.3	55.62	57.9	88.30	23
96.2	02.67	79.1	45.31	57.5	29.02	69.4	66.79	19.3	56.08	59.3	88.67	24
97.2	03.10	80.6	45.66	58.5	29.46	70.9	67.16	20.4	56.54	60.8	89.04	25
98.2	03.53	82.1	46.02	59.5	29.91	72.4	67.52	21.4	56.99	62.3	89.41	26
99.2	03.97	83.7	46.37	60.6	30.35	73.9	67.88	22.4	57.45	63.8	89.78	27
2700.2	04.40	85.2	46.73	61.6	30.80	75.4	68.24	23.5	57.91	65.3	90.15	28
01.3	04.83	86.7	47.08	62.6	31.25	76.9	68.60	24.5	58.37	66.8	90.51	29
2702.3	605.27	4888.2	547.44	2763.7	631.69	4978.4	568.96	2825.6	658.83	5068.3	590.88	30
03.3	05.70	89.7	47.79	64.7	32.14	79.9	69.33	26.6	59.29	69.8	91.25	31
04.3	06.14	91.2	48.15	65.7	32.59	81.4	69.69	27.6	59.74	71.3	91.62	32
05.3	06.57	92.7	48.51	66.7	33.03	82.9	70.05	28.7	60.20	72.8	91.99	33
06.4	07.01	94.2	48.86	67.8	33.48	84.4	70.41	29.7	60.66	74.3	92.36	34
07.4	07.44	95.7	49.22	68.8	33.93	85.9	70.78	30.7	61.12	75.8	92.73	35
08.4	07.88	97.2	49.57	69.8	34.37	87.4	71.14	31.8	61.58	77.3	93.10	36
09.4	08.32	98.7	49.93	70.8	34.82	88.9	71.50	32.8	62.04	78.8	93.47	37
10.4	08.75	4900.2	50.29	71.9	35.27	90.4	71.86	33.8	62.50	80.3	93.84	38
11.5	09.19	01.7	50.64	72.9	35.72	91.9	72.23	34.9	62.96	81.8	94.20	39
2712.5	609.62	4903.2	551.00	2773.9	636.17	4993.4	572.59	2835.9	663.42	5083.3	594.57	40
13.5	10.06	04.8	51.36	75.0	36.61	94.9	72.95	37.0	63.88	84.8	94.94	41
14.5	10.50	06.3	51.71	76.0	37.06	96.4	73.32	38.0	64.34	86.2	95.31	42
15.5	10.93	07.8	52.07	77.0	37.51	97.9	73.68	39.0	64.80	87.7	95.68	43
16.6	11.37	09.3	52.43	78.1	37.96	99.4	74.04	40.1	65.26	89.2	96.05	44
17.6	11.81	10.8	52.78	79.1	38.41	5000.9	74.41	41.1	65.72	90.7	96.42	45
18.6	12.25	12.3	53.14	80.1	38.86	02.4	74.77	42.1	66.18	92.2	96.79	46
19.6	12.68	13.8	53.50	81.1	39.31	03.9	75.13	43.2	66.64	93.7	97.16	47
20.6	13.12	15.3	53.85	82.2	39.76	05.4	75.50	44.2	67.11	95.2	97.53	48
21.7	13.56	16.8	54.21	83.2	40.21	06.9	75.86	45.3	67.57	96.7	97.91	49
2722.7	614.00	4918.3	554.57	2784.2	640.66	5008.4	576.23	2846.3	668.03	5098.2	598.28	50
23.7	14.44	19.8	54.93	85.3	41.11	09.9	76.59	47.3	68.49	99.7	98.65	51
24.7	14.88	21.3	55.29	86.3	41.56	11.4	76.96	48.4	68.96	5101.2	99.02	52
25.7	15.31	22.8	55.64	87.3	42.01	12.9	77.32	49.4	69.42	02.7	99.39	53
26.8	15.75	24.3	56.00	88.4	42.46	14.4	77.68	50.5	69.88	04.2	99.76	54
27.8	16.19	25.8	56.36	89.4	42.91	15.9	78.05	51.5	70.34	05.7	600.13	55
28.8	16.63	27.3	56.72	90.4	43.36	17.4	78.41	52.5	70.81	07.1	00.50	56
29.8	17.07	28.8	57.08	91.4	43.81	18.9	78.78	53.6	71.27	08.6	00.87	57
30.9	17.51	30.3	57.43	92.5	44.27	20.4	79.14	54.6	71.74	10.1	01.25	58
31.9	17.95	31.8	57.79	93.5	44.72	21.9	79.51	55.7	72.20	11.6	01.62	59

	53°				54°				55°			
I	T	E	C	M	T	E	C	M	T	E	C	M
0	2856.7	672.66	5113.1	601.99	2919.4	700.89	5202.4	624.50	2982.7	729.85	5291.3	647.39
1	57.7	73.13	14.6	02.36	20.5	01.36	03.9	24.87	83.7	30.34	92.8	47.77
2	58.8	73.59	16.1	02.73	21.5	01.84	05.4	25.25	84.8	30.83	94.3	48.16
3	59.8	74.06	17.6	03.11	22.6	02.32	06.9	25.63	85.8	31.32	95.8	48.54
4	60.9	74.52	19.1	03.48	23.6	02.79	08.4	26.01	86.9	31.81	97.2	48.93
5	61.9	74.99	20.6	03.85	24.7	03.27	09.8	26.39	88.0	32.30	98.7	49.31
6	62.9	75.45	22.1	04.22	25.7	03.75	11.3	26.77	89.0	32.79	5300.2	49.70
7	64.0	75.92	23.6	04.60	26.8	04.23	12.8	27.14	90.1	33.28	01.7	50.08
8	65.0	76.38	25.0	04.97	27.8	04.71	14.3	27.52	91.1	33.77	03.1	50.47
9	66.1	76.85	26.5	05.34	28.9	05.18	15.8	27.90	92.2	34.26	04.6	50.86
10	2867.1	677.32	5128.0	605.71	2929.9	705.66	5217.3	628.28	2993.3	734.76	5306.1	651.24
11	68.2	77.78	29.5	06.09	31.0	06.14	18.7	28.66	94.3	35.25	07.6	51.63
12	69.2	78.25	31.0	06.46	32.0	06.62	20.2	29.04	95.4	35.74	09.0	52.01
13	70.2	78.72	32.5	06.83	33.1	07.10	21.7	29.42	96.5	36.23	10.5	52.40
14	71.3	79.19	34.0	07.21	34.1	07.58	23.2	29.80	97.5	36.72	12.0	52.79
15	72.3	79.65	35.5	07.58	35.2	08.06	24.7	30.18	98.6	37.21	13.5	53.17
16	73.4	80.12	37.0	07.95	36.2	08.54	26.2	30.56	99.6	37.70	15.0	53.56
17	74.4	80.59	38.5	08.33	37.3	09.02	27.6	30.94	3000.7	38.20	16.4	53.94
18	75.5	81.05	39.9	08.70	38.3	09.50	29.1	31.32	01.8	38.69	17.9	54.33
19	76.5	81.52	41.4	09.07	39.4	09.98	30.6	31.70	02.8	39.18	19.4	54.72
20	2877.5	681.99	5142.9	609.45	2940.4	710.46	5232.1	632.08	3003.9	739.68	5320.9	655.11
21	78.6	82.46	44.4	09.82	41.5	10.94	33.6	32.46	04.9	40.17	22.3	55.49
22	79.6	82.93	45.9	10.20	42.5	11.42	35.1	32.84	06.0	40.67	23.8	55.88
23	80.7	83.40	47.4	10.57	43.6	11.90	36.5	33.22	07.1	41.16	25.3	56.27
24	81.7	83.86	48.9	10.94	44.6	12.38	38.0	33.61	08.1	41.65	26.8	56.65
25	82.8	84.33	50.4	11.32	45.7	12.86	39.5	33.99	09.2	42.15	28.2	57.04
26	83.8	84.80	51.9	11.69	46.7	13.35	41.0	34.37	10.3	42.64	29.7	57.43
27	84.8	85.27	53.3	12.07	47.8	13.83	42.5	34.75	11.3	43.14	31.2	57.82
28	85.9	85.74	54.8	12.44	48.9	14.31	44.0	35.13	12.4	43.63	32.7	58.20
29	86.9	86.21	56.3	12.82	49.9	14.79	45.4	35.51	13.5	44.13	34.1	58.59
30	2888.0	686.68	5157.8	613.19	2951.0	715.28	5246.9	635.89	3014.5	744.62	5335.6	658.98
31	89.0	87.15	59.3	13.57	52.0	15.76	48.4	36.27	15.6	45.12	37.1	59.37
32	90.1	87.62	60.8	13.94	53.1	16.24	49.9	36.66	16.6	45.61	38.6	59.76
33	91.1	88.09	62.3	14.32	54.1	16.73	51.4	37.04	17.7	46.11	40.0	60.15
34	92.2	88.57	63.8	14.69	55.2	17.21	52.8	37.42	18.8	46.61	41.5	60.53
35	93.2	89.04	65.3	15.07	56.2	17.69	54.3	37.80	19.8	47.10	43.0	60.92
36	94.3	89.51	66.7	15.45	57.3	18.18	55.8	38.18	20.9	47.60	44.5	61.31
37	95.3	89.98	68.2	15.82	58.3	18.66	57.3	38.57	22.0	48.09	45.9	61.70
38	96.3	90.45	69.7	16.20	59.4	19.15	58.8	38.95	23.0	48.59	47.4	62.09
39	97.4	90.92	71.2	16.57	60.5	19.63	60.2	39.33	24.1	49.09	48.9	62.48
40	2898.4	691.40	5172.7	616.95	2961.5	720.12	5261.7	639.71	3025.2	749.59	5350.4	662.87
41	99.5	91.87	74.2	17.33	62.6	20.60	63.2	40.10	26.2	50.08	51.8	63.25
42	2900.5	92.34	75.7	17.70	63.6	21.08	64.7	40.48	27.3	50.58	53.3	63.64
43	01.6	92.82	77.2	18.08	64.7	21.57	66.2	40.86	28.4	51.08	54.8	64.03
44	02.6	93.29	78.6	18.45	65.7	22.06	67.6	41.25	29.4	51.58	56.3	64.42
45	03.7	93.76	80.1	18.83	66.8	22.54	69.1	41.63	30.5	52.08	57.7	64.81
46	04.7	94.23	81.6	19.21	67.9	23.03	70.6	42.01	31.6	52.58	59.2	65.20
47	05.8	94.71	83.1	19.59	68.9	23.51	72.1	42.39	32.6	53.07	60.7	65.59
48	06.8	95.18	84.6	19.96	70.0	24.00	73.6	42.78	33.7	53.57	62.1	65.98
49	07.9	95.66	86.1	20.34	71.0	24.49	75.0	43.16	34.8	54.07	63.6	66.37
50	2908.9	696.13	5187.6	620.72	2972.1	724.97	5276.5	643.55	3035.8	754.57	5365.1	666.76
51	10.0	96.61	89.0	21.09	73.1	25.46	78.0	43.93	36.9	55.07	66.6	67.15
52	11.0	97.08	90.5	21.47	74.2	25.95	79.5	44.31	38.0	55.57	68.0	67.54
53	12.1	97.56	92.0	21.85	75.3	26.44	81.0	44.70	39.0	56.07	69.5	67.93
54	13.1	98.03	93.5	22.23	76.3	26.92	82.4	45.08	40.1	56.57	71.0	68.32
55	14.2	98.51	95.0	22.60	77.4	27.41	83.9	45.47	41.2	57.07	72.5	68.71
56	15.2	98.98	96.5	22.98	78.4	27.90	85.4	45.85	42.2	57.57	73.9	69.10
57	16.3	99.46	98.0	23.36	79.5	28.39	86.9	46.23	43.3	58.08	75.4	69.50
58	17.3	99.93	99.4	23.74	80.5	28.88	88.4	46.62	44.4	58.58	76.9	69.89
59	18.4	700.41	5200.9	24.12	81.6	29.37	89.8	47.00	45.4	59.08	78.3	70.28

56°				57°				58°				
T	E	C	M	T	E	C	M	T	E	C	M	′
3046.5	75.958	5379.8	670.67	3110.9	79.008	5467.9	694.33	3176.0	82.137	5555.6	718.38	0
47.6	60.08	81.3	71.06	12.0	90.60	69.4	94.73	77.1	21.90	57.0	18.79	1
48.6	60.58	82.8	71.45	13.1	91.11	70.8	95.13	78.2	22.42	58.5	19.19	2
49.7	61.09	84.2	71.84	14.2	91.63	72.3	95.53	79.3	22.95	60.0	19.60	3
50.8	61.59	85.7	72.23	15.3	92.14	73.8	95.93	80.4	23.48	61.4	20.00	4
51.9	62.09	87.2	72.63	16.3	92.66	75.2	96.33	81.4	24.01	62.9	20.41	5
52.9	62.60	88.6	73.02	17.4	93.17	76.7	96.72	82.5	24.54	64.3	20.81	6
54.0	63.10	90.1	73.41	18.5	93.69	78.2	97.12	83.6	25.07	65.8	21.22	7
55.1	63.60	91.6	73.80	19.6	94.21	79.6	97.52	84.7	25.60	67.2	21.62	8
56.1	64.11	93.1	74.20	20.7	94.72	81.1	97.92	85.8	26.13	68.7	22.03	9
3057.2	764.61	5394.5	674.59	3121.7	795.24	5482.5	698.32	3186.9	826.66	5570.2	722.43	10
58.3	65.11	96.0	74.98	22.8	95.76	84.0	98.72	88.0	27.19	71.6	22.84	11
59.3	65.62	97.5	75.37	23.9	96.27	85.5	99.11	89.1	27.72	73.1	23.24	12
60.4	66.12	98.9	75.76	25.0	96.79	86.9	99.51	90.2	28.25	74.5	23.65	13
61.5	66.63	5400.4	76.16	26.1	97.31	88.4	99.91	91.3	28.79	76.0	24.05	14
62.6	67.13	01.9	76.55	27.2	97.83	89.9	700.31	92.4	29.32	77.4	24.46	15
63.6	67.64	03.3	76.94	28.2	98.35	91.3	00.71	93.5	29.85	78.9	24.86	16
64.7	68.14	04.8	77.34	29.3	98.86	92.8	01.11	94.5	30.38	80.3	25.27	17
65.8	68.65	06.3	77.73	30.4	99.38	94.3	01.51	95.6	30.91	81.8	25.67	18
66.8	69.15	07.8	78.12	31.5	99.90	95.7	01.91	96.7	31.44	83.3	26.08	19
3067.9	769.66	5409.2	678.52	3132.6	800.42	5497.2	702.31	3197.8	831.98	5584.7	726.49	20
69.0	70.16	10.7	78.91	33.6	00.94	98.6	02.71	98.9	32.51	86.2	26.89	21
70.1	70.67	12.2	79.30	34.7	01.46	5500.1	03.11	3200.0	33.04	87.6	27.30	22
71.1	71.18	13.6	79.70	35.8	01.98	01.6	03.51	01.1	33.58	89.1	27.71	23
72.2	71.69	15.1	80.09	36.9	02.50	03.0	03.91	02.2	34.11	90.5	28.11	24
73.3	72.19	16.6	80.48	38.0	03.02	04.5	04.31	03.3	34.64	92.0	28.52	25
74.4	72.70	18.0	80.88	39.1	03.54	05.9	04.71	04.4	35.18	93.4	28.93	26
75.4	73.21	19.5	81.27	40.1	04.06	07.4	05.11	05.5	35.71	94.9	29.33	27
76.5	73.72	21.0	81.67	41.2	04.58	08.9	05.51	06.6	36.24	96.3	29.74	28
77.6	74.22	22.4	82.06	42.3	05.10	10.3	05.91	07.7	36.78	97.8	30.15	29
3078.7	774.73	5423.9	682.46	3143.4	805.63	5511.8	706.31	3208.8	837.31	5599.3	730.55	30
79.7	75.24	25.4	82.85	44.5	06.15	13.3	06.71	09.9	37.85	5600.7	30.96	31
80.8	75.75	26.8	83.24	45.6	06.67	14.7	07.11	10.9	38.38	02.2	31.37	32
81.9	76.26	28.3	83.64	46.6	07.19	16.2	07.52	12.0	38.92	03.6	31.78	33
82.9	76.77	29.8	84.03	47.7	07.71	17.6	07.92	13.1	39.46	05.1	32.18	34
84.0	77.28	31.3	84.43	48.8	08.23	19.1	08.32	14.2	39.99	06.5	32.59	35
85.1	77.79	32.7	84.82	49.9	08.76	20.6	08.72	15.3	40.53	08.0	33.00	36
86.2	78.30	34.2	85.22	51.0	09.28	22.0	09.12	16.4	41.06	09.4	33.41	37
87.2	78.81	35.7	85.61	52.1	09.80	23.5	09.52	17.5	41.60	10.9	33.81	38
88.3	79.32	37.1	86.01	53.2	10.33	24.9	09.92	18.6	42.14	12.3	34.22	39
3089.4	779.83	5438.6	686.40	3154.2	810.85	5526.4	710.33	3219.7	842.67	5613.8	734.63	40
90.5	80.34	40.1	86.80	55.3	11.37	27.9	10.73	20.8	43.21	15.2	35.04	41
91.6	80.85	41.5	87.20	56.4	11.90	29.3	11.13	21.9	43.75	16.7	35.45	42
92.6	81.36	43.0	87.59	57.5	12.42	30.8	11.53	23.0	44.29	18.2	35.86	43
93.7	81.87	44.5	87.99	58.6	12.95	32.2	11.93	24.1	44.83	19.6	36.26	44
94.8	82.38	45.9	88.38	59.7	13.47	33.7	12.34	25.2	45.36	21.1	36.67	45
95.9	82.89	47.4	88.78	60.8	14.00	35.2	12.74	26.3	45.90	22.5	37.08	46
96.9	83.40	48.9	89.18	61.8	14.52	36.6	13.14	27.4	46.44	24.0	37.49	47
98.0	83.92	50.3	89.57	62.9	15.05	38.1	13.54	28.5	46.98	25.4	37.90	48
99.1	84.43	51.8	89.97	64.0	15.57	39.5	13.95	29.6	47.52	26.9	38.31	49
3100.2	784.94	5453.3	690.36	3165.1	816.10	5541.0	714.35	3230.7	848.06	5628.3	738.72	50
01.2	85.45	54.7	90.76	66.2	16.62	42.5	14.75	31.8	48.60	29.8	39.13	51
02.3	85.97	56.2	91.16	67.3	17.15	43.9	15.15	32.9	49.14	31.2	39.54	52
03.4	86.48	57.7	91.55	68.4	17.68	45.4	15.56	34.0	49.68	32.7	39.95	53
04.5	87.00	59.1	91.95	69.5	18.20	46.8	15.96	35.1	50.22	34.1	40.36	54
05.6	87.51	60.6	92.35	70.6	18.73	48.3	16.37	36.2	50.76	35.6	40.77	55
06.6	88.02	62.0	92.75	71.6	19.26	49.7	16.77	37.3	51.30	37.0	41.18	56
07.7	88.54	63.5	93.14	72.7	19.79	51.2	17.17	38.4	51.84	38.5	41.59	57
08.8	89.05	65.0	93.54	73.8	20.31	52.7	17.58	39.5	52.38	39.9	42.00	58
09.9	89.57	66.4	93.94	74.9	20.84	54.1	17.98	40.6	52.92	41.4	42.41	59

	59°				60°				61°			
I	T	E	C	M	T	E	C	M	T	E	C	M
0	3241.7	853.46	5642.8	742.82	3308.0	886.38	5729.7	767.63	3375.0	920.14	5816.0	792.82
1	42.8	54.01	44.3	43.23	09.1	86.94	31.1	68.04	76.1	20.71	17.5	93.24
2	43.9	54.55	45.7	43.64	10.2	87.49	32.5	68.46	77.3	21.28	18.9	93.66
3	45.0	55.09	47.2	44.05	11.3	88.05	34.0	68.88	78.4	21.85	20.3	94.09
4	46.1	55.63	48.6	44.46	12.5	88.60	35.4	69.30	79.5	22.42	21.8	94.51
5	47.2	56.18	50.1	44.87	13.6	89.16	36.9	69.71	80.6	21.99	23.2	94.93
6	48.3	56.72	51.5	45.28	14.7	89.72	38.3	70.13	81.8	23.56	24.6	95.36
7	49.4	57.26	53.0	45.69	15.8	90.27	39.8	70.55	82.9	24.13	26.1	95.78
8	50.5	57.80	54.4	46.10	16.9	90.83	41.2	70.96	84.0	24.70	27.5	96.20
9	51.6	58.35	55.9	46.51	18.0	91.39	42.6	71.38	85.1	25.27	29.0	96.63
10	3252.7	858.89	5657.3	746.93	3319.1	891.95	5744.1	771.80	3386.3	925.84	5830.4	797.05
11	53.8	59.44	58.8	47.34	20.2	92.50	45.5	72.22	87.4	26.42	31.8	97.47
12	54.9	59.98	60.2	47.75	21.4	93.06	47.0	72.63	88.5	26.99	33.3	97.90
13	56.0	60.52	61.7	48.16	22.5	93.62	48.4	73.05	89.6	27.56	34.7	98.32
14	57.1	61.07	63.1	48.57	23.6	94.18	49.8	73.47	90.8	28.13	36.1	98.75
15	58.2	61.61	64.6	48.98	24.7	94.74	51.3	73.89	91.9	28.71	37.6	99.17
16	59.3	62.16	66.0	49.40	25.8	95.30	52.7	74.31	93.0	29.28	39.0	99.60
17	60.4	62.71	67.5	49.81	26.9	95.86	54.2	74.73	94.1	29.86	40.4	800.02
18	61.5	63.25	68.9	50.22	28.0	96.42	55.6	75.15	95.3	30.43	41.9	00.45
19	62.6	63.80	70.4	50.63	29.2	96.98	57.1	75.56	96.4	31.00	43.3	00.87
20	3263.7	864.34	5671.8	751.05	3330.3	897.54	5758.5	775.98	3397.5	931.58	5844.7	801.30
21	64.8	64.89	73.3	51.46	31.4	98.10	59.9	76.40	98.6	32.15	46.2	01.72
22	65.9	65.44	74.7	51.87	32.5	98.66	61.4	76.82	99.8	32.73	47.6	02.15
23	67.0	65.98	76.2	52.28	33.6	99.22	62.8	77.24	3400.9	33.30	49.0	02.57
24	68.1	66.53	77.6	52.70	34.7	99.78	64.3	77.66	02.0	33.88	50.5	03.00
25	69.2	67.08	79.1	53.11	35.9	900.34	65.7	78.08	03.1	34.45	51.9	03.42
26	70.3	67.62	80.5	53.52	37.0	00.90	67.1	78.50	04.3	35.03	53.3	03.85
27	71.4	68.17	82.0	53.94	38.1	01.47	68.6	78.92	05.4	35.61	54.8	04.27
28	72.6	68.72	83.4	54.35	39.2	02.03	70.0	79.33	06.5	36.18	56.2	04.70
29	73.7	69.27	84.8	54.76	40.3	02.59	71.5	79.75	07.7	36.76	57.6	05.13
30	3274.8	869.82	5686.3	755.17	3341.4	903.15	5772.9	780.17	3408.8	937.34	5859.1	805.55
31	75.9	70.37	87.7	55.59	42.6	03.72	74.3	80.59	09.9	37.91	60.5	05.98
32	77.0	70.92	89.2	56.00	43.7	04.28	75.8	81.01	11.0	38.49	61.9	06.40
33	78.1	71.46	90.6	56.42	44.8	04.84	77.2	81.43	12.2	39.07	63.4	06.83
34	79.2	72.01	92.1	56.83	45.9	05.41	78.7	81.85	13.3	39.65	64.8	07.26
35	80.3	72.56	93.5	57.24	47.0	05.97	80.1	82.28	14.4	40.22	66.2	07.68
36	81.4	73.11	95.0	57.66	48.1	06.53	81.5	82.70	15.6	40.80	67.7	08.11
37	82.5	73.66	96.4	58.07	49.3	07.10	83.0	83.12	16.7	41.38	69.1	08.54
38	83.6	74.21	97.9	58.49	50.4	07.66	84.4	83.54	17.8	41.96	70.5	08.96
39	84.7	74.76	99.3	58.90	51.5	08.22	85.9	83.96	18.9	42.54	71.9	09.39
40	3285.8	875.31	5700.8	759.32	3352.6	908.79	5787.3	784.38	3420.1	943.12	5873.4	809.82
41	86.9	75.87	02.2	59.73	53.7	09.35	88.7	84.80	21.2	43.70	74.8	10.24
42	88.0	76.42	03.6	60.14	54.8	09.92	90.2	85.22	22.3	44.28	76.2	10.67
43	89.2	76.97	05.1	60.56	56.0	10.49	91.6	85.64	23.5	44.86	77.7	11.10
44	90.3	77.52	06.5	60.97	57.1	11.05	93.0	86.06	24.6	45.44	79.1	11.53
45	91.4	78.07	08.0	61.39	58.2	11.62	94.5	86.48	25.7	46.02	80.5	11.96
46	92.5	78.62	09.4	61.80	59.3	12.18	95.9	86.90	26.9	46.60	82.0	12.38
47	93.6	79.18	10.9	62.22	60.4	12.75	97.4	87.33	28.0	47.18	83.4	12.81
48	94.7	79.73	12.3	62.64	61.6	13.32	98.8	87.75	29.1	47.76	84.8	13.24
49	95.8	80.28	13.8	63.05	62.7	13.89	5800.2	88.17	30.3	48.34	86.3	13.67
50	3296.9	880.84	5715.2	763.47	3363.8	914.45	5801.7	788.59	3431.4	948.92	5887.7	814.09
51	98.0	81.39	16.7	63.88	64.9	15.02	03.1	89.01	32.5	49.50	89.1	14.52
52	99.1	81.94	18.1	64.30	66.0	15.59	04.5	89.44	33.7	50.09	90.5	14.95
53	3300.2	82.50	19.5	64.71	67.2	16.15	06.0	89.86	34.8	50.67	92.0	15.38
54	01.4	83.05	21.0	65.13	68.3	16.72	07.4	90.28	35.9	51.25	93.4	15.81
55	02.5	83.61	22.4	65.55	69.4	17.29	08.9	90.70	37.1	51.83	94.8	16.24
56	03.6	84.16	23.9	65.96	70.5	17.86	10.3	91.12	38.2	52.42	96.3	16.67
57	04.7	84.71	25.3	66.38	71.7	18.43	11.7	91.55	39.3	53.00	97.7	17.09
58	05.8	85.27	26.8	66.79	72.8	19.00	13.2	91.97	40.5	53.58	99.1	17.52
59	06.9	85.82	28.2	67.21	73.9	19.57	14.6	92.39	41.6	54.17	5900.5	17.95

62°				63°				64°				
T	E	C	M	T	E	C	M	T	E	C	M	/
3442.7	959.75	5902.0	818.38	3511.1	990.24	5987.5	844.32	3580.3	1026.6	6072.5	870.63	0
43.9	55.33	03.4	18.81	12.3	90.84	88.9	44.76	81.4	27.2	73.9	71.07	1
45.0	53.92	04.8	19.24	13.4	91.44	90.3	45.19	82.6	27.9	75.3	71.52	2
46.1	56.50	06.3	19.67	14.6	92.04	91.7	45.63	83.8	28.5	76.7	71.96	3
47.3	57.09	07.7	20.10	15.7	92.64	93.2	46.06	84.9	29.1	78.2	72.40	4
48.4	57.67	09.1	20.53	16.9	93.24	94.6	46.50	86.1	29.7	79.6	72.84	5
49.5	58.26	10.5	20.96	18.0	93.84	96.0	46.93	87.2	30.3	81.0	73.28	6
50.7	58.85	12.0	21.39	19.2	94.44	97.4	47.37	88.4	30.9	82.4	73.72	7
51.8	59.43	13.4	21.82	20.3	95.04	98.8	47.81	89.6	31.5	83.8	74.17	8
52.9	60.02	14.8	22.25	21.5	95.64	6000.3	48.24	90.7	32.2	85.2	74.61	9
3454.1	960.61	5916.3	822.68	3522.6	996.24	6001.7	848.68	3591.9	1032.8	6086.6	875.05	10
55.2	61.19	17.7	23.11	23.8	96.85	03.1	49.12	93.0	33.4	88.0	75.49	11
56.3	61.78	19.1	23.54	24.9	97.45	04.5	49.55	94.2	34.0	89.5	75.94	12
57.5	62.37	20.5	23.97	26.1	98.05	05.9	49.99	95.4	34.6	90.9	76.38	13
58.6	62.95	22.0	24.40	27.2	98.65	07.4	50.43	96.5	35.3	92.3	76.82	14
59.8	63.54	23.4	24.83	28.4	99.25	08.8	50.86	97.7	35.9	93.7	77.27	15
60.9	64.13	24.8	25.26	29.5	99.86	10.2	51.30	98.8	36.5	95.1	77.71	16
62.0	64.72	26.2	25.69	30.7	1000.5	11.6	51.74	3600.0	37.1	96.5	78.15	17
63.2	65.31	27.7	26.12	31.8	01.1	13.0	52.17	01.2	37.7	97.9	78.60	18
64.3	65.89	29.1	26.55	33.0	01.7	14.4	52.61	02.3	38.3	99.3	79.04	19
3465.4	966.48	5930.5	826.99	3534.1	1002.3	6015.9	853.05	3603.5	1039.0	6100.7	879.48	20
66.6	67.07	31.9	27.42	35.3	02.9	17.3	53.49	04.7	39.6	02.2	79.93	21
67.7	67.66	33.4	27.85	36.4	03.5	18.7	53.92	05.8	40.2	03.6	80.37	22
68.9	68.25	34.8	28.28	37.6	04.1	20.1	54.36	07.0	40.8	05.0	80.82	23
70.0	68.84	36.2	28.71	38.7	04.7	21.5	54.80	08.2	41.4	06.4	81.26	24
71.1	69.43	37.7	29.14	39.9	05.3	23.0	55.24	09.3	42.1	07.8	81.70	25
72.3	70.02	39.1	29.58	41.0	05.9	24.4	55.68	10.5	42.7	09.2	82.15	26
73.4	70.61	40.5	30.01	42.2	06.5	25.8	56.11	11.6	43.3	10.6	82.59	27
74.6	71.20	41.9	30.44	43.3	07.1	27.2	56.55	12.8	43.9	12.0	83.04	28
75.7	71.79	43.4	30.87	44.5	07.7	28.6	56.99	14.0	44.5	13.4	83.48	29
3476.8	972.39	5944.8	831.30	3545.6	1008.3	6030.0	857.43	3615.1	1045.2	6114.8	883.93	30
78.0	72.98	46.2	31.74	46.8	08.9	31.5	57.87	16.3	45.8	16.3	84.37	31
79.1	73.57	47.6	32.17	47.9	09.5	32.9	58.31	17.5	46.4	17.7	84.81	32
80.3	74.16	49.1	32.60	49.1	10.1	34.3	58.74	18.6	47.0	19.1	85.26	33
81.4	74.75	50.5	33.03	50.2	10.8	35.7	59.18	19.8	47.7	20.5	85.70	34
82.5	75.35	51.9	33.47	51.4	11.4	37.1	59.62	21.0	48.3	21.9	86.15	35
83.7	75.94	53.3	33.90	52.5	12.0	38.5	60.06	22.1	48.9	23.3	86.59	36
84.8	76.53	54.7	34.33	53.7	12.6	40.0	60.50	23.3	49.5	24.7	87.04	37
86.0	77.12	56.2	34.77	54.8	13.2	41.4	60.94	24.5	50.1	26.1	87.49	38
87.1	77.72	57.6	35.20	56.0	13.8	42.8	61.38	25.6	50.8	27.5	87.93	39
3488.2	978.31	5959.0	835.63	3557.2	1014.4	6044.2	861.82	3626.8	1051.4	6128.9	888.38	40
89.4	78.91	60.4	36.07	58.3	15.0	45.6	62.26	28.0	52.0	30.3	88.82	41
90.5	79.50	61.9	36.50	59.5	15.6	47.0	62.70	29.1	52.6	31.8	89.27	42
91.7	80.10	63.3	36.93	60.6	16.2	48.5	63.14	30.3	53.3	33.2	89.72	43
92.8	80.69	64.7	37.37	61.8	16.8	49.9	63.58	31.5	53.9	34.6	90.16	44
94.0	81.29	66.1	37.80	62.9	17.4	51.3	64.02	32.6	54.5	36.0	90.61	45
95.1	81.88	67.6	38.23	64.1	18.1	52.7	64.46	33.8	55.1	37.4	91.05	46
96.2	82.48	69.0	38.67	65.2	18.7	54.1	64.90	35.0	55.8	38.8	91.50	47
97.4	83.07	70.4	39.10	66.4	19.3	55.5	65.34	36.1	56.4	40.2	91.95	48
98.5	83.67	71.8	39.54	67.5	19.9	56.9	65.78	37.3	57.0	41.6	92.39	49
3499.7	984.27	5973.3	839.97	3568.7	1020.5	6058.4	866.22	3638.5	1057.7	6143.0	892.84	50
3500.8	84.86	74.7	40.40	69.9	21.1	59.8	66.66	39.7	58.3	44.4	93.29	51
02.0	85.46	76.1	40.84	71.0	21.7	61.2	67.10	40.8	58.9	45.8	93.73	52
03.1	86.05	77.5	41.27	72.2	22.3	62.6	67.54	42.0	59.5	47.2	94.18	53
04.3	86.65	78.9	41.71	73.3	22.9	64.0	67.98	43.2	60.2	48.6	94.63	54
05.4	87.25	80.4	42.14	74.5	23.6	65.4	68.42	44.3	60.8	50.0	95.07	55
06.6	87.85	81.8	42.58	75.6	24.2	66.8	68.87	45.5	61.4	51.5	95.52	56
07.7	88.45	83.2	43.01	76.8	24.8	68.3	69.31	46.7	62.0	52.9	95.97	57
08.8	89.04	84.6	43.45	78.0	25.4	69.7	69.75	47.8	62.7	54.3	96.42	58
10.0	89.64	86.0	43.88	79.1	26.0	71.1	70.19	49.0	63.3	55.7	96.86	59

I	65°				66°				67°			
	T	E	C	M	T	E	C	M	T	E	C	M
0	3650.2	1063.9	6157.1	897.31	3720.9	1102.2	6241.2	924.36	3792.4	1141.4	6324.8	951.78
1	51.4	64.6	58.5	97.76	22.1	02.8	42.6	24.82	93.6	42.0	26.2	52.24
2	52.5	65.2	59.9	98.21	23.2	03.5	44.0	25.27	94.8	42.7	27.6	52.70
3	53.7	65.8	61.3	98.66	24.4	04.1	45.4	25.72	96.0	43.4	29.0	53.16
4	54.9	66.5	62.7	99.10	25.6	04.8	46.8	26.18	97.2	44.0	30.4	53.62
5	56.1	67.1	64.1	99.55	26.8	05.4	48.2	26.63	98.4	44.7	31.8	54.08
6	57.2	67.7	65.5	900.00	28.0	06.1	49.6	27.09	99.6	45.3	33.1	54.54
7	58.4	68.3	66.9	00.45	29.2	06.7	51.0	27.54	3800.8	46.0	34.5	55.00
8	59.6	69.0	68.3	00.90	30.4	07.3	52.4	28.00	02.0	46.7	35.9	55.46
9	60.7	69.6	69.7	01.35	31.6	08.0	53.8	28.45	03.2	47.3	37.3	55.92
10	3661.9	1070.2	6171.1	901.80	3732.7	1108.6	6255.2	928.90	3804.4	1148.0	6338.7	956.38
11	63.1	70.9	72.5	02.24	33.9	09.3	56.5	29.36	05.6	48.7	40.1	56.84
12	64.3	71.5	73.9	02.69	35.1	09.9	57.9	29.81	06.8	49.3	41.5	57.30
13	65.4	72.1	75.3	03.14	36.3	10.6	59.3	30.27	08.0	50.0	42.9	57.76
14	66.6	72.8	76.7	03.59	37.5	11.2	60.7	30.72	09.2	50.7	44.3	58.23
15	67.8	73.4	78.1	04.04	38.7	11.9	62.1	31.18	10.4	51.3	45.6	58.69
16	69.0	74.0	79.6	04.49	39.9	12.5	63.5	31.64	11.6	52.0	47.0	59.15
17	70.1	74.7	81.0	04.94	41.1	13.2	64.9	32.09	12.8	52.7	48.4	59.61
18	71.3	75.3	82.4	05.39	42.2	13.8	66.3	32.55	14.0	53.3	49.8	60.07
19	72.5	75.9	83.8	05.84	43.4	14.5	67.7	33.00	15.2	54.0	51.2	60.53
20	3673.7	1076.6	6185.2	906.29	3744.6	1115.1	6269.1	933.46	3816.4	1154.7	6352.6	960.99
21	74.8	77.2	86.6	06.74	45.8	15.8	70.5	33.91	17.6	55.3	54.0	61.46
22	76.0	77.8	88.0	07.19	47.0	16.4	71.9	34.37	18.8	56.0	55.4	61.92
23	77.2	78.5	89.4	07.64	48.2	17.1	73.3	34.83	20.0	56.7	56.7	62.38
24	78.4	79.1	90.8	08.09	49.4	17.7	74.7	35.28	21.2	57.3	58.1	62.84
25	79.5	79.8	92.2	08.54	50.6	18.4	76.1	35.74	22.4	58.0	59.5	63.31
26	80.7	80.4	93.6	08.99	51.8	19.0	77.5	36.20	23.6	58.7	60.9	63.77
27	81.9	81.0	95.0	09.44	52.9	19.7	78.9	36.65	24.8	59.3	62.3	64.23
28	83.1	81.7	96.4	09.89	54.1	20.3	80.3	37.11	26.0	60.0	63.7	64.69
29	84.3	82.3	97.8	10.34	55.3	21.0	81.7	37.57	27.2	60.7	65.1	65.16
30	3685.4	1082.9	6199.2	910.79	3756.5	1121.7	6283.1	938.02	3828.4	1161.3	6366.4	965.62
31	86.6	83.6	6200.6	11.24	57.7	22.3	84.5	38.48	29.6	62.0	67.8	66.08
32	87.8	84.2	02.0	11.69	58.9	23.0	85.8	38.94	30.8	62.7	69.2	66.55
33	89.0	84.8	03.4	12.14	60.1	23.6	87.2	39.39	32.0	63.4	70.6	67.01
34	90.1	85.5	04.8	12.59	61.3	24.3	88.6	39.85	33.3	64.0	72.0	67.47
35	91.3	86.1	06.2	13.05	62.5	24.9	90.0	40.31	34.5	64.7	73.4	67.94
36	92.5	86.8	07.6	13.50	63.7	25.6	91.4	40.77	35.7	65.4	74.8	68.40
37	93.7	87.4	09.0	13.95	64.9	26.2	92.8	41.22	36.9	66.0	76.1	68.86
38	94.9	88.0	10.4	14.40	66.1	26.9	94.2	41.68	38.1	66.7	77.5	69.33
39	96.0	88.7	11.8	14.85	67.3	27.5	95.6	42.14	39.3	67.4	78.9	69.79
40	3697.2	1089.3	6213.2	915.30	3768.5	1128.2	6297.0	942.60	3840.5	1168.1	6380.3	970.26
41	98.4	90.0	14.6	15.76	69.6	28.9	98.4	43.06	41.7	68.7	81.7	70.72
42	99.6	90.6	16.0	16.21	70.8	29.5	99.8	43.51	42.9	69.4	83.1	71.18
43	3700.8	91.2	17.4	16.66	72.0	30.2	6301.2	43.97	44.1	70.1	84.5	71.65
44	02.0	91.9	18.8	17.11	73.2	30.8	02.6	44.43	45.3	70.7	85.8	72.11
45	03.1	92.5	20.2	17.56	74.4	31.5	03.9	44.89	46.5	71.4	87.2	72.58
46	04.3	93.2	21.6	18.02	75.6	32.1	05.3	45.35	47.7	72.1	88.6	73.04
47	05.5	93.8	23.0	18.47	76.8	32.8	06.7	45.80	49.0	72.8	90.0	73.51
48	06.7	94.5	24.4	18.92	78.0	33.5	08.1	46.26	50.2	73.4	91.4	73.97
49	07.9	95.1	25.8	19.37	79.2	34.1	09.5	46.72	51.4	74.1	92.8	74.44
50	3709.0	1095.7	6227.2	919.83	3780.4	1134.8	6310.9	947.18	3852.6	1174.8	6394.1	974.90
51	10.2	96.4	28.6	20.28	81.6	35.4	12.3	47.64	53.8	75.5	95.5	75.37
52	11.4	97.0	30.0	20.73	82.8	36.1	13.7	48.10	55.0	76.1	96.9	75.83
53	12.6	97.7	31.4	21.19	84.0	36.8	15.1	48.56	56.2	76.8	98.3	76.30
54	13.8	98.3	32.8	21.64	85.2	37.4	16.5	49.02	57.4	77.5	99.7	76.76
55	15.0	99.0	34.2	22.09	86.4	38.1	17.9	49.48	58.6	78.2	6401.0	77.23
56	16.1	99.6	35.6	22.55	87.6	38.7	19.2	49.94	59.8	78.8	02.4	77.69
57	17.3	1100.2	37.0	23.00	88.8	39.4	20.6	50.40	61.1	79.5	03.8	78.16
58	18.5	00.9	38.4	23.45	90.0	40.1	22.0	50.86	62.3	80.2	05.2	78.62
59	19.7	01.5	39.8	23.91	91.2	40.7	23.4	51.32	63.5	80.9	06.6	79.09

68°				69°				70°				′
T	E	C	M	T	E	C	M	T	E	C	M	
3864.7	1181.6	6408.0	979.56	3937.9	1222.7	6490.6	1007.7	4011.9	1265.0	6572.8	1036.2	0
65.9	82.2	09.3	80.02	39.1	23.4	92.0	08.2	13.2	65.7	74.2	36.7	1
67.1	82.9	10.7	80.49	40.3	24.1	93.4	08.6	14.4	66.4	75.5	37.2	2
68.3	83.6	12.1	80.95	41.6	24.8	94.7	09.1	15.7	67.1	76.9	37.6	3
69.5	84.3	13.5	81.42	42.8	25.5	96.1	09.6	16.9	67.8	78.2	38.1	4
70.8	85.0	14.9	81.89	44.0	26.2	97.5	10.1	18.2	68.5	79.6	38.6	5
72.0	85.6	16.2	82.35	45.2	26.9	98.9	10.5	19.4	69.2	81.0	39.1	6
73.2	86.3	17.6	82.82	46.5	27.6	6500.2	11.0	20.6	70.0	82.3	39.5	7
74.4	87.0	19.0	83.29	47.7	28.3	01.6	11.5	21.9	70.7	83.7	40.0	8
75.6	87.7	20.4	83.75	48.9	29.0	03.0	11.9	23.1	71.4	85.1	40.5	9
3876.8	1188.4	6421.8	984.22	3950.2	1229.7	6504.3	1012.4	4024.4	1272.1	6586.4	1041.0	10
78.0	89.0	23.2	84.69	51.4	30.4	05.7	12.9	25.6	72.8	87.8	41.5	11
79.3	89.7	24.5	85.15	52.6	31.1	07.1	13.4	26.9	73.5	89.2	41.9	12
80.5	90.4	25.9	85.62	53.9	31.8	08.5	13.8	28.1	74.2	90.5	42.4	13
81.7	91.1	27.3	86.09	55.1	32.5	09.8	14.3	29.4	75.0	91.9	42.9	14
82.9	91.8	28.7	86.56	56.3	33.2	11.2	14.8	30.6	75.7	93.2	43.4	15
84.1	92.4	30.0	87.02	57.5	33.9	12.6	15.3	31.8	76.4	94.6	43.9	16
85.3	93.1	31.4	87.49	58.8	34.6	14.0	15.7	33.1	77.1	96.0	44.3	17
86.6	93.8	32.8	87.96	60.0	35.3	15.3	16.2	34.3	77.8	97.3	44.8	18
87.8	94.5	34.2	88.43	61.2	36.0	16.7	16.7	35.6	78.5	98.7	45.3	19
3889.0	1195.2	6435.6	988.89	3962.5	1236.7	6518.1	1017.2	4036.8	1279.3	6600.1	1045.8	20
90.2	95.9	36.9	89.36	63.7	37.4	19.4	17.6	38.1	80.0	01.4	46.3	21
91.4	96.5	38.3	89.83	64.9	38.1	20.8	18.1	39.3	80.7	02.8	46.7	22
92.6	97.2	39.7	90.30	66.2	38.8	22.2	18.6	40.6	81.4	04.1	47.2	23
93.9	97.9	41.1	90.77	67.4	39.5	23.5	19.1	41.8	82.1	05.5	47.7	24
95.1	98.6	42.5	91.24	68.6	40.2	24.9	19.5	43.1	82.9	06.9	48.2	25
96.3	99.3	43.8	91.70	69.9	40.9	26.3	20.0	44.3	83.6	08.2	48.7	26
97.5	1200.0	45.2	92.17	71.1	41.6	27.7	20.5	45.6	84.3	09.6	49.1	27
98.7	00.7	46.6	92.64	72.3	42.3	29.0	21.0	46.8	85.0	11.0	49.6	28
3900.0	01.3	48.0	93.11	73.6	43.0	30.4	21.4	48.1	85.7	12.3	50.1	29
3901.2	1202.0	6449.4	993.58	3974.8	1243.7	6531.8	1021.9	4049.3	1286.5	6613.7	1050.6	30
02.4	02.7	50.7	94.05	76.0	44.4	33.1	22.4	50.6	87.2	15.0	51.1	31
03.6	03.4	52.1	94.52	77.3	45.1	34.5	22.9	51.8	87.9	16.4	51.5	32
04.8	04.1	53.5	94.99	78.5	45.8	35.9	23.3	53.1	88.6	17.8	52.0	33
06.1	04.8	54.9	95.46	79.7	46.5	37.2	23.8	54.3	89.4	19.1	52.5	34
07.3	05.5	56.2	95.93	81.0	47.2	38.6	24.3	55.6	90.1	20.5	53.0	35
08.5	06.1	57.6	96.40	82.2	47.9	40.0	24.8	56.8	90.8	21.8	53.5	36
09.7	06.8	59.0	96.87	83.4	48.7	41.3	25.2	58.1	91.5	23.2	53.9	37
10.9	07.5	60.4	97.34	84.7	49.4	42.7	25.7	59.3	92.2	24.6	54.4	38
12.2	08.2	61.7	97.81	85.9	50.1	44.1	26.2	60.6	93.0	25.9	54.9	39
3913.4	1208.9	6463.1	998.28	3987.2	1250.8	6545.5	1026.7	4061.8	1293.7	6627.3	1055.4	40
14.6	09.6	64.5	98.75	88.4	51.5	46.8	27.1	63.1	94.4	28.6	55.9	41
15.8	10.3	65.9	99.22	89.6	52.3	48.2	27.6	64.3	95.1	30.0	56.4	42
17.1	11.0	67.2	99.69	90.9	52.9	49.6	28.1	65.6	95.9	31.4	56.8	43
18.3	11.7	68.6	1000.2	92.1	53.6	50.9	28.6	66.8	96.6	32.7	57.3	44
19.5	12.4	70.0	00.6	93.3	54.3	52.3	29.0	68.1	97.3	34.1	57.8	45
20.7	13.0	71.4	01.1	94.6	55.0	53.7	29.5	69.3	98.0	35.4	58.3	46
21.9	13.7	72.8	01.6	95.8	55.7	55.0	30.0	70.6	98.8	36.8	58.8	47
23.2	14.4	74.1	02.0	97.1	56.4	56.4	30.5	71.9	99.5	38.2	59.3	48
24.4	15.1	75.5	02.5	98.3	57.1	57.8	30.9	73.1	1300.2	39.5	59.7	49
3925.6	1215.8	6476.9	1003.0	3999.5	1257.9	6559.1	1031.4	4074.4	1300.9	6640.9	1060.2	50
26.8	16.5	78.3	03.5	4000.8	58.6	60.5	31.9	75.6	01.7	42.2	60.7	51
28.1	17.2	79.6	03.9	02.0	59.3	61.9	32.4	76.9	02.4	43.6	61.2	52
29.3	17.9	81.0	04.4	03.3	60.0	63.2	32.9	78.1	03.1	44.9	61.7	53
30.5	18.6	82.4	04.9	04.5	60.7	64.6	33.3	79.4	03.9	46.3	62.2	54
31.7	19.3	83.7	05.3	05.7	61.4	66.0	33.8	80.6	04.6	47.7	62.6	55
33.0	20.0	85.1	05.8	07.0	62.1	67.3	34.3	81.9	05.3	49.0	63.1	56
34.2	20.7	86.5	06.3	08.2	62.8	68.7	34.8	83.1	06.0	50.4	63.6	57
35.4	21.4	87.9	06.8	09.5	63.5	70.1	35.2	84.4	06.8	51.7	64.1	58
36.7	22.0	89.2	07.2	10.7	64.3	71.4	35.7	85.7	07.5	53.1	64.6	59

	71°				72°				73°			
′	T	E	C	M	T	E	C	M	T	E	C	M
0	4086.9	1308.2	6654.5	1065.1	4162.8	1352.6	6735.6	1094.3	4239.7	1398.0	6816.3	1123.8
1	88.2	09.0	55.8	65.5	64.1	53.3	37.0	94.8	41.0	98.8	17.6	24.3
2	89.4	09.7	57.2	66.0	65.4	54.1	38.3	95.2	42.3	99.6	18.9	24.8
3	90.7	10.4	58.5	66.5	66.7	54.8	39.7	95.7	43.6	1400.4	20.3	25.3
4	92.0	11.2	59.9	67.0	67.9	55.6	41.0	96.2	44.9	01.1	21.6	25.8
5	93.2	11.9	61.2	67.5	69.2	56.3	42.3	96.7	46.2	01.9	23.0	26.3
6	94.5	12.6	62.6	68.0	70.5	57.1	43.7	97.2	47.5	02.7	24.3	26.8
7	95.7	13.4	63.9	68.4	71.8	57.8	45.0	97.7	48.8	03.4	25.6	27.3
8	97.0	14.1	65.3	68.9	73.0	58.6	46.4	98.2	50.0	04.2	27.0	27.8
9	98.2	14.8	66.7	69.4	74.3	59.3	47.7	98.7	51.3	05.0	28.3	28.3
10	4099.5	1315.5	6668.0	1069.9	4175.6	1360.1	6749.1	1099.2	4252.6	1405.7	6829.6	1128.8
11	4100.8	16.3	69.4	70.4	76.9	60.8	50.4	99.7	53.9	06.5	31.0	29.3
12	02.0	17.0	70.7	70.9	78.1	61.6	51.8	1100.2	55.2	07.3	32.3	29.8
13	03.3	17.8	72.1	71.4	79.4	62.3	53.1	00.6	56.5	08.0	33.7	30.3
14	04.5	18.5	73.4	71.8	80.7	63.1	54.5	01.1	57.8	08.8	35.0	30.8
15	05.8	19.2	74.8	72.3	82.0	63.8	55.8	01.6	59.1	09.6	36.3	31.3
16	07.1	20.0	76.1	72.8	83.2	64.6	57.2	02.1	60.4	10.4	37.7	31.8
17	08.3	20.7	77.5	73.3	84.5	65.4	58.5	02.6	61.7	11.1	39.0	32.3
18	09.6	21.4	78.9	73.8	85.8	66.1	59.9	03.1	63.0	11.9	40.3	32.8
19	10.9	22.2	80.2	74.3	87.1	66.9	61.2	03.6	64.3	12.7	41.7	33.3
20	4112.1	1322.9	6681.6	1074.8	4188.4	1367.6	6762.5	1104.1	4265.6	1413.5	6843.0	1133.8
21	13.4	23.6	82.9	75.2	89.6	68.4	63.9	04.6	66.9	14.2	44.4	34.3
22	14.6	24.4	84.3	75.7	90.9	69.1	65.2	05.1	68.2	15.0	45.7	34.8
23	15.9	25.1	85.6	76.2	92.2	69.9	66.6	05.6	69.5	15.8	47.0	35.3
24	17.2	25.8	87.0	76.7	93.5	70.6	67.9	06.1	70.7	16.6	48.4	35.8
25	18.4	26.6	88.3	77.2	94.8	71.4	69.3	06.5	72.0	17.3	49.7	36.3
26	19.7	27.3	89.7	77.7	96.0	72.1	70.6	07.0	73.3	18.1	51.0	36.8
27	21.0	28.1	91.0	78.2	97.3	72.9	72.0	07.5	74.6	18.9	52.4	37.3
28	22.2	28.8	92.4	78.6	98.6	73.7	73.3	08.0	75.9	19.7	53.7	37.7
29	23.5	29.5	93.7	79.1	99.9	74.4	74.7	08.5	77.2	20.4	55.0	38.2
30	4124.8	1330.3	6695.1	1079.6	4201.2	1375.2	6776.0	1109.0	4278.5	1421.2	6856.4	1138.7
31	26.0	31.0	96.4	80.1	02.4	75.9	77.3	09.5	79.8	22.0	57.7	39.2
32	27.3	31.8	97.8	80.6	03.7	76.7	78.7	10.0	81.1	22.8	59.1	39.7
33	28.6	32.5	99.2	81.1	05.0	77.5	80.0	10.5	82.4	23.5	60.4	40.2
34	29.8	33.2	6700.5	81.6	06.3	78.2	81.4	11.0	83.7	24.3	61.7	40.7
35	31.1	34.0	01.9	82.1	07.6	79.0	82.7	11.5	85.0	25.1	63.1	41.2
36	32.4	34.7	03.2	82.5	08.8	79.7	84.1	12.0	86.3	25.9	64.4	41.7
37	33.6	35.5	04.6	83.0	10.1	80.5	85.4	12.5	87.6	26.6	65.7	42.2
38	34.9	36.2	05.9	83.5	11.4	81.2	86.7	13.0	88.9	27.4	67.1	42.7
39	36.2	36.9	07.3	84.0	12.7	82.0	88.1	13.4	90.2	28.2	68.4	43.2
40	4137.4	1337.7	6708.6	1084.5	4214.0	1382.8	6789.4	1113.9	4291.5	1429.0	6869.7	1143.7
41	38.7	38.4	10.0	85.0	15.3	83.5	90.8	14.4	92.8	29.8	71.1	44.2
42	40.0	39.2	11.3	85.5	16.5	84.3	92.1	14.9	94.1	30.5	72.4	44.7
43	41.2	39.9	12.7	86.0	17.8	85.1	93.5	15.4	95.4	31.3	73.7	45.2
44	42.5	40.7	14.0	86.4	19.1	85.8	94.8	15.9	96.7	32.1	75.1	45.7
45	43.8	41.4	15.4	86.9	20.4	86.6	96.1	16.4	98.0	32.9	76.4	46.2
46	45.0	42.1	16.7	87.4	21.7	87.3	97.5	16.9	99.3	33.7	77.7	46.7
47	46.3	42.9	18.1	87.9	23.0	88.1	98.8	17.4	4300.6	34.5	79.1	47.2
48	47.6	43.6	19.4	88.4	24.3	88.9	6800.2	17.9	01.9	35.2	80.4	47.7
49	48.8	44.4	20.8	88.9	25.5	89.6	01.5	18.4	03.2	36.0	81.7	48.2
50	4150.1	1345.1	6722.1	1089.4	4226.8	1390.4	6802.8	1118.9	4304.5	1436.8	6883.1	1148.7
51	51.4	45.9	23.5	89.9	28.1	91.1	04.2	19.4	05.9	37.6	84.4	49.2
52	52.7	46.6	24.8	90.4	29.4	91.9	05.5	19.9	07.2	38.4	85.7	49.7
53	53.9	47.4	26.2	90.8	30.7	92.7	06.9	20.4	08.5	39.2	87.1	50.2
54	55.2	48.1	27.5	91.3	32.0	93.5	08.2	20.9	09.8	39.9	88.4	50.7
55	56.5	48.8	28.9	91.8	33.3	94.2	09.6	21.4	11.1	40.7	89.7	51.2
56	57.7	49.6	30.2	92.3	34.6	95.0	10.9	21.9	12.4	41.5	91.1	51.7
57	59.0	50.3	31.6	92.8	35.9	95.7	12.2	22.3	13.7	42.3	92.4	52.2
58	60.3	51.1	32.9	93.3	37.1	96.5	13.6	22.8	15.0	43.1	93.7	52.7
59	61.6	51.8	34.3	93.8	38.4	97.3	14.9	23.3	16.3	43.9	95.0	53.2

74°				75°				76°				
T	E	C	M	T	E	C	M	T	E	C	M	′
4317.6	1444.6	6896.4	1153.7	4396.5	1432.4	6976.0	1184.0	4476.5	1541.4	7055.0	1214.6	0
18.9	45.4	97.7	54.3	97.8	93.2	77.3	84.5	77.8	42.2	56.4	15.1	1
20.2	46.2	99.0	54.8	99.2	94.0	78.6	85.0	79.2	43.0	57.7	15.7	2
21.5	47.0	6900.4	55.3	4400.5	94.8	79.9	85.5	80.5	43.9	59.0	16.2	3
22.8	47.8	01.7	55.8	01.8	95.6	81.3	86.0	81.9	44.7	60.3	16.7	4
24.1	48.6	03.0	56.3	03.1	96.4	82.6	86.6	83.2	45.5	61.6	17.2	5
25.4	49.4	04.4	56.8	04.5	97.3	83.9	87.1	84.6	46.3	62.9	17.7	6
26.8	50.2	05.7	57.3	05.8	98.1	85.2	87.6	85.9	47.2	64.2	18.2	7
28.1	50.9	07.0	57.8	07.1	98.9	86.6	88.1	87.2	48.0	65.6	18.7	8
29.4	51.7	08.4	58.3	08.4	99.7	87.9	88.6	88.6	48.8	66.9	19.2	9
4330.7	1452.5	6909.7	1158.9	4409.8	1500.5	6989.2	1189.1	4489.9	1549.7	7068.2	1219.8	10
32.0	53.3	11.0	59.3	11.1	01.3	90.5	89.6	91.3	50.5	69.5	20.3	11
33.3	54.1	12.3	59.8	12.4	02.1	91.8	90.1	92.6	51.3	70.8	20.8	12
34.6	54.9	13.7	60.3	13.8	02.9	93.2	90.6	94.0	52.1	72.1	21.3	13
35.9	55.7	15.0	60.8	15.1	03.7	94.5	91.1	95.3	53.0	73.4	21.8	14
37.2	56.5	16.3	61.3	16.4	04.5	95.8	91.6	96.7	53.8	74.7	22.3	15
38.5	57.3	17.7	61.8	17.7	05.4	97.1	92.1	98.0	54.6	76.0	22.8	16
39.9	58.1	19.0	62.3	19.1	06.2	98.4	92.7	99.4	55.5	77.4	23.4	17
41.2	58.9	20.3	62.8	20.4	07.0	99.8	93.2	4500.7	56.3	78.7	23.9	18
42.5	59.6	21.6	63.3	21.7	07.8	7001.1	93.7	02.0	57.1	80.0	24.4	19
4343.8	1460.4	6923.0	1163.8	4423.1	1508.6	7002.4	1194.2	4503.4	1558.0	7081.3	1224.9	20
45.1	61.2	24.3	64.3	24.4	09.4	03.7	94.7	04.7	58.8	82.6	25.4	21
46.4	62.0	25.6	64.8	25.7	10.2	05.0	95.2	06.1	59.6	83.9	25.9	22
47.7	62.8	27.0	65.3	27.0	11.0	06.4	95.7	07.4	60.5	85.2	26.4	23
49.0	63.6	28.3	65.8	28.4	11.9	07.7	96.2	08.8	61.3	86.5	27.0	24
50.4	64.4	29.6	66.3	29.7	12.7	09.0	96.7	10.1	62.1	87.8	27.5	25
51.7	65.2	30.9	66.8	31.0	13.5	10.3	97.2	11.5	63.0	89.1	28.0	26
53.0	66.0	32.3	67.3	32.4	14.3	11.6	97.7	12.8	63.8	90.5	28.5	27
54.3	66.8	33.6	67.8	33.7	15.1	12.9	98.3	14.2	64.6	91.8	29.0	28
55.6	67.6	34.9	68.3	35.0	15.9	14.3	98.8	15.5	65.5	93.1	29.5	29
4356.9	1468.4	6936.2	1168.8	4436.4	1516.7	7015.6	1199.3	4516.9	1566.3	7094.4	1230.1	30
58.2	69.2	37.6	69.3	37.7	17.6	16.9	99.8	18.2	67.2	95.7	30.6	31
59.6	70.0	38.9	69.8	39.0	18.4	18.2	1200.3	19.6	68.0	97.0	31.1	32
60.9	70.8	40.2	70.4	40.4	19.2	19.5	00.8	20.9	68.8	98.3	31.6	33
62.2	71.6	41.6	70.9	41.7	20.0	20.9	01.3	22.3	69.7	99.6	32.1	34
63.5	72.4	42.9	71.4	43.0	20.8	22.2	01.8	23.7	70.5	7100.9	32.6	35
64.8	73.2	44.2	71.9	44.4	21.6	23.5	02.3	25.0	71.3	02.2	33.2	36
66.1	74.0	45.5	72.4	45.7	22.5	24.8	02.8	26.4	72.2	03.5	33.7	37
67.5	74.8	46.9	72.9	47.0	23.3	26.1	03.4	27.7	73.0	04.8	34.2	38
68.8	75.6	48.2	73.4	48.4	24.1	27.4	03.9	29.1	73.9	06.2	34.7	39
4370.1	1476.4	6949.5	1173.9	4449.7	1524.9	7028.8	1204.4	4530.4	1574.7	7107.5	1235.2	40
71.4	77.2	50.8	74.4	51.1	25.7	30.1	04.9	31.8	75.5	08.8	35.7	41
72.7	78.0	52.2	74.9	52.4	26.6	31.4	05.4	33.1	76.4	10.1	36.3	42
74.0	78.8	53.5	75.4	53.7	27.4	32.7	05.9	34.5	77.2	11.4	36.8	43
75.4	79.6	54.8	75.9	55.1	28.2	34.0	06.4	35.8	78.1	12.7	37.3	44
76.7	80.4	56.1	76.4	56.4	29.0	35.3	06.9	37.2	78.9	14.0	37.8	45
78.0	81.2	57.5	76.9	57.7	29.8	36.6	07.4	38.6	79.7	15.3	38.3	46
79.3	82.0	58.8	77.4	59.1	30.7	38.0	08.0	39.9	80.6	16.6	38.8	47
80.6	82.8	60.1	77.9	60.4	31.5	39.3	08.5	41.3	81.4	17.9	39.4	48
82.0	83.6	61.4	78.4	61.7	32.3	40.6	09.0	42.6	82.3	19.2	39.9	49
4383.3	1484.4	6962.8	1178.9	4463.1	1533.1	7041.9	1209.5	4544.0	1583.1	7120.5	1240.4	50
84.6	85.2	64.1	79.4	64.4	34.0	43.2	10.0	45.3	84.0	21.8	40.9	51
85.9	86.0	65.4	80.0	65.8	34.8	44.5	10.5	46.7	84.8	23.1	41.4	52
87.3	86.8	66.7	80.5	67.1	35.6	45.8	11.0	48.1	85.7	24.4	41.9	53
88.6	87.6	68.0	81.0	68.4	36.4	47.2	11.5	49.4	86.5	25.8	42.5	54
89.9	88.4	69.4	81.5	69.8	37.3	48.5	12.1	50.8	87.3	27.1	43.0	55
91.2	89.2	70.7	82.0	71.1	38.1	49.8	12.6	52.1	88.2	28.4	43.5	56
92.5	90.0	72.0	82.5	72.5	38.9	51.1	13.1	53.5	89.0	29.7	44.0	57
93.9	90.8	73.3	83.0	73.8	39.7	52.4	13.6	54.8	89.9	31.0	44.5	58
95.2	91.6	74.7	83.5	75.2	40.6	53.7	14.1	56.2	90.7	32.3	45.1	59

	77°				78°				79°			
I	T	E	C	M	T	E	C	M	T	E	C	M
0	4557.6	1591.6	7133.6	1245.6	4639.8	1643.0	7211.6	1276.9	4723.2	1695.8	7289.0	1308.5
1	58.9	92.4	34.9	46.1	41.2	43.9	12.9	77.4	24.6	96.7	90.3	09.0
2	60.3	93.3	36.2	46.6	42.5	44.8	14.2	77.9	26.0	97.6	91.6	09.6
3	61.7	94.1	37.5	47.1	43.9	45.6	15.5	78.4	27.4	98.5	92.9	10.1
4	63.0	95.0	38.8	47.7	45.3	46.5	16.7	79.0	28.8	99.4	94.2	10.6
5	64.4	95.8	40.1	48.2	46.7	47.4	18.0	79.5	30.2	1700.2	95.4	11.2
6	65.7	96.7	41.4	48.7	48.1	48.2	19.3	80.0	31.6	01.1	96.7	11.7
7	67.1	97.5	42.7	49.2	49.4	49.1	20.6	80.5	33.0	02.0	98.0	12.2
8	68.5	98.4	44.0	49.7	50.8	50.0	21.9	81.1	34.4	02.9	99.3	12.8
9	69.8	99.2	45.3	50.3	52.2	50.9	23.2	81.6	35.8	03.8	7300.6	13.3
10	4571.2	1600.1	7146.6	1250.8	4653.6	1651.7	7224.5	1282.1	4737.2	1704.7	7301.9	1313.8
11	72.6	00.9	47.9	51.3	55.0	52.6	25.8	82.6	38.6	05.6	03.1	14.3
12	73.9	01.8	49.2	51.8	56.4	53.5	27.1	83.2	40.0	06.5	04.4	14.9
13	75.3	02.6	50.5	52.3	57.7	54.3	28.4	83.7	41.4	07.4	05.7	15.4
14	76.6	03.5	51.8	52.9	59.1	55.2	29.7	84.2	42.8	08.3	07.0	15.9
15	78.0	04.3	53.1	53.4	60.5	56.1	31.0	84.8	44.2	09.2	08.3	16.5
16	79.4	05.2	54.4	53.9	61.9	57.0	32.3	85.3	45.6	10.1	09.6	17.0
17	80.7	06.0	55.7	54.4	63.3	57.8	33.6	85.8	47.0	11.0	10.9	17.5
18	82.1	06.9	57.0	54.9	64.7	58.7	34.9	86.3	48.4	11.9	12.1	18.1
19	83.5	07.7	58.3	55.5	66.1	59.6	36.2	86.9	49.8	12.8	13.4	18.6
20	4584.8	1608.6	7159.6	1256.0	4667.4	1660.5	7237.4	1287.4	4751.2	1713.7	7314.7	1319.1
21	86.2	09.4	60.9	56.5	68.8	61.3	38.7	87.9	52.6	14.6	16.0	19.7
22	87.6	10.3	62.2	57.0	70.2	62.2	40.0	88.4	54.0	15.5	17.3	20.2
23	88.9	11.1	63.5	57.5	71.6	63.1	41.3	89.0	55.4	16.4	18.6	20.7
24	90.3	12.0	64.8	58.1	73.0	64.0	42.6	89.5	56.8	17.3	19.8	21.3
25	91.7	12.9	66.1	58.6	74.4	64.9	43.9	90.0	58.3	18.2	21.1	21.8
26	93.1	13.7	67.4	59.1	75.8	65.7	45.2	90.5	59.7	19.1	22.4	22.3
27	94.4	14.6	68.7	59.6	77.2	66.6	46.5	91.1	61.1	20.0	23.7	22.9
28	95.8	15.4	70.0	60.1	78.5	67.5	47.8	91.6	62.5	20.9	25.0	23.4
29	97.2	16.3	71.3	60.7	79.9	68.4	49.1	92.1	63.9	21.8	26.2	23.9
30	4598.5	1617.1	7172.6	1261.2	4681.3	1669.2	7250.4	1292.7	4765.3	1722.7	7327.5	1324.5
31	99.9	18.0	73.9	61.7	82.7	70.1	51.7	93.2	66.7	23.6	28.8	25.0
32	4601.3	18.9	75.2	62.2	84.1	71.0	52.9	93.7	68.1	24.5	30.1	25.5
33	02.6	19.7	76.5	62.8	85.5	71.9	54.2	94.2	69.5	25.4	31.4	26.1
34	04.0	20.6	77.8	63.3	86.9	72.8	55.5	94.8	70.9	26.3	32.6	26.6
35	05.4	21.4	79.1	63.8	88.3	73.6	56.8	95.3	72.4	27.2	33.9	27.1
36	06.8	22.3	80.4	64.3	89.7	74.5	58.1	95.8	73.8	28.1	35.2	27.7
37	08.1	23.2	81.7	64.8	91.1	75.4	59.4	96.3	75.2	29.0	36.5	28.2
38	09.5	24.0	83.0	65.4	92.4	76.3	60.7	96.9	76.6	29.9	37.8	28.7
39	10.9	24.9	84.3	65.9	93.8	77.2	62.0	97.4	78.0	30.8	39.1	29.3
40	4612.2	1625.7	7185.6	1266.4	4695.2	1678.1	7263.3	1297.9	4779.4	1731.7	7340.3	1329.8
41	13.6	26.6	86.9	66.9	96.6	78.9	64.5	98.5	80.8	32.6	41.6	30.3
42	15.0	27.5	88.2	67.5	98.0	79.8	65.8	99.0	82.2	33.5	42.9	30.9
43	16.4	28.3	89.5	68.0	99.4	80.7	67.1	99.5	83.7	34.4	44.2	31.4
44	17.7	29.2	90.8	68.5	4700.8	81.6	68.4	1300.0	85.1	35.3	45.4	31.9
45	19.1	30.0	92.1	69.0	02.2	82.5	69.7	00.6	86.5	36.2	46.7	32.5
46	20.5	30.9	93.4	69.5	03.6	83.4	71.0	01.1	87.9	37.1	48.0	33.0
47	21.9	31.8	94.7	70.1	05.0	84.2	72.3	01.6	89.3	38.0	49.3	33.5
48	23.2	32.6	96.0	70.6	06.4	85.1	73.6	02.2	90.7	38.9	50.6	34.1
49	24.6	33.5	97.3	71.1	07.8	86.0	74.9	02.7	92.1	39.9	51.8	34.6
50	4626.0	1634.4	7198.6	1271.6	4709.2	1686.9	7276.1	1303.2	4793.6	1740.8	7353.1	1335.1
51	27.4	35.2	99.9	72.2	10.6	87.8	77.4	03.7	95.0	41.7	54.4	35.7
52	28.8	36.1	7201.2	72.7	12.0	88.7	78.7	04.3	96.4	42.6	55.7	36.2
53	30.1	37.0	02.5	73.2	13.4	89.6	80.0	04.8	97.8	43.5	57.0	36.7
54	31.5	37.8	03.8	73.7	14.8	90.5	81.3	05.3	99.2	44.4	58.2	37.3
55	32.9	38.7	05.1	74.3	16.2	91.3	82.6	05.9	4800.7	45.3	59.5	37.8
56	34.3	39.6	06.4	74.8	17.6	92.2	83.9	06.4	02.1	46.2	60.8	38.3
57	35.6	40.4	07.7	75.3	19.0	93.1	85.2	06.9	03.5	47.1	62.1	38.9
58	37.0	41.3	09.0	75.8	20.4	94.0	86.4	07.4	04.9	48.1	63.3	39.4
59	38.4	42.2	10.3	76.4	21.8	94.9	87.7	08.0	06.3	49.0	64.6	39.9

80°				81°				82°				
T	E	C	M	T	E	C	M	T	E	C	M	I
4807.7	1749.9	7365.9	1340.5	4893.6	1805.3	7442.2	1372.8	4980.7	1862.2	7518.0	1405.4	0
09.2	50.8	67.2	41.0	95.0	06.3	43.5	73.3	82.2	63.2	19.2	06.0	1
10.6	51.7	68.5	41.6	96.5	07.2	44.8	73.9	83.6	64.1	20.5	06.5	2
12.0	52.6	69.7	42.1	97.9	08.1	46.0	74.4	85.1	65.1	21.8	07.1	3
13.4	53.5	71.0	42.6	99.4	09.1	47.3	75.0	86.6	66.1	23.0	07.6	4
14.9	54.4	72.3	43.2	4900.8	10.0	48.6	75.5	88.0	67.0	24.3	08.2	5
16.3	55.4	73.6	43.7	02.2	11.0	49.8	76.0	89.5	68.0	25.5	08.7	6
17.7	56.3	74.8	44.2	03.7	11.9	51.1	76.6	91.0	68.9	26.8	09.3	7
19.1	57.2	76.1	44.8	05.1	12.8	52.4	77.1	92.4	69.9	28.0	09.8	8
20.5	58.1	77.4	45.3	06.6	13.8	53.6	77.7	93.9	70.9	29.3	10.4	9
4822.0	1759.0	7378.7	1345.8	4908.0	1814.7	7454.9	1378.2	4995.4	1871.8	7530.5	1410.9	10
23.4	59.9	79.9	46.4	09.5	15.7	56.2	78.7	96.8	72.8	31.8	11.4	11
24.8	60.9	81.2	46.9	10.9	16.6	57.4	79.3	98.3	73.8	33.1	12.0	12
26.2	61.8	82.5	47.5	12.4	17.5	58.7	79.8	99.8	74.7	34.3	12.5	13
27.7	62.7	83.8	48.0	13.8	18.5	60.0	80.4	5001.2	75.7	35.6	13.1	14
29.1	63.6	85.0	48.5	15.2	19.4	61.2	80.9	02.7	76.7	36.8	13.6	15
30.5	64.5	86.3	49.1	16.7	20.4	62.5	81.5	04.2	77.6	38.1	14.2	16
31.9	65.4	87.6	49.6	18.1	21.3	63.7	82.0	05.6	78.6	39.3	14.7	17
33.4	66.4	88.9	50.1	19.6	22.3	65.0	82.5	07.1	79.6	40.6	15.3	18
34.8	67.3	90.1	50.7	21.0	23.2	66.3	83.1	08.6	80.5	41.8	15.8	19
4836.2	1768.2	7391.4	1351.2	4922.5	1824.1	7467.5	1383.6	5010.0	1881.5	7543.1	1416.4	20
37.6	69.1	92.7	51.8	23.9	25.1	68.8	84.2	11.5	82.5	44.4	16.9	21
39.1	70.1	93.9	52.3	25.4	26.0	70.1	84.7	13.0	83.4	45.6	17.5	22
40.5	71.0	95.2	52.8	26.8	27.0	71.3	85.3	14.5	84.4	46.9	18.0	23
41.9	71.9	96.5	53.4	28.3	27.9	72.6	85.8	15.9	85.4	48.1	18.6	24
43.4	72.8	97.8	53.9	29.7	28.9	73.9	86.3	17.4	86.3	49.4	19.1	25
44.8	73.7	99.0	54.4	31.2	29.8	75.1	86.9	18.9	87.3	50.6	19.7	26
46.2	74.7	7400.3	55.0	32.6	30.8	76.4	87.4	20.3	88.3	51.9	20.2	27
47.6	75.6	01.6	55.5	34.1	31.7	77.6	88.0	21.8	89.2	53.1	20.8	28
49.1	76.5	02.9	56.1	35.5	32.6	78.9	88.5	23.3	90.2	54.4	21.3	29
4850.5	1777.4	7404.1	1356.6	4937.0	1833.6	7480.2	1389.1	5024.8	1891.2	7555.6	1421.9	30
51.9	78.4	05.4	57.1	38.4	34.5	81.4	89.6	26.2	92.2	56.9	22.4	31
53.4	79.3	06.7	57.7	39.9	35.5	82.7	90.2	27.7	93.1	58.1	23.0	32
54.8	80.2	07.9	58.2	41.3	36.4	84.0	90.7	29.2	94.1	59.4	23.5	33
56.2	81.1	09.2	58.7	42.8	37.4	85.2	91.2	30.7	95.1	60.7	24.1	34
57.7	82.1	10.5	59.3	44.2	38.3	86.5	91.8	32.1	96.1	61.9	24.6	35
59.1	83.0	11.8	59.8	45.7	39.3	87.7	92.3	33.6	97.0	63.2	25.2	36
60.5	83.9	13.0	60.4	47.2	40.2	89.0	92.9	35.1	98.0	64.4	25.7	37
62.0	84.8	14.3	60.9	48.6	41.2	90.3	93.4	36.6	99.0	65.7	26.3	38
63.4	85.8	15.6	61.4	50.1	42.1	91.5	94.0	38.1	1900.0	66.9	26.8	39
4864.8	1786.7	7416.8	1362.0	4951.5	1843.1	7492.8	1394.5	5039.5	1900.9	7568.2	1427.4	40
66.3	87.6	18.1	62.5	53.0	44.0	94.1	95.1	41.0	01.9	69.4	27.9	41
67.7	88.6	19.4	63.1	54.4	45.0	95.3	95.6	42.5	02.9	70.7	28.5	42
69.1	89.5	20.7	63.6	55.9	46.0	96.6	96.1	44.0	03.9	71.9	29.0	43
70.6	90.4	21.9	64.1	57.3	46.9	97.8	96.7	45.4	04.8	73.2	29.6	44
72.0	91.3	23.2	64.7	58.8	47.9	99.1	97.2	46.9	05.8	74.4	30.1	45
73.4	92.3	24.5	65.2	60.3	48.8	7500.4	97.8	48.4	06.8	75.7	30.7	46
74.9	93.2	25.7	65.8	61.7	49.8	01.6	98.3	49.9	07.8	76.9	31.2	47
76.3	94.1	27.0	66.3	63.2	50.7	02.9	98.9	51.4	08.7	78.2	31.8	48
77.8	95.1	28.3	66.8	64.6	51.7	04.1	99.4	52.8	09.7	79.4	32.3	49
4879.2	1796.0	7429.5	1367.4	4966.1	1852.6	7505.4	1400.0	5054.3	1910.7	7580.7	1432.9	50
80.6	96.9	30.8	67.9	67.6	53.6	06.6	00.5	55.8	11.7	81.9	33.4	51
82.1	97.9	32.1	68.5	69.0	54.5	07.9	01.1	57.3	12.7	83.2	34.0	52
83.5	98.8	33.3	69.0	70.5	55.5	09.2	01.6	58.8	13.7	84.4	34.5	53
84.9	99.7	34.6	69.5	71.9	56.5	10.4	02.1	60.3	14.6	85.7	35.1	54
86.4	1800.7	35.9	70.1	73.4	57.4	11.7	02.7	61.7	15.6	86.9	35.6	55
87.8	01.6	37.1	70.6	74.9	58.4	12.9	03.2	63.2	16.6	88.2	36.2	56
89.3	02.5	38.4	71.2	76.3	59.3	14.2	03.8	64.7	17.6	89.4	36.7	57
90.7	03.5	39.7	71.7	77.8	60.3	15.5	04.3	66.2	18.6	90.7	37.3	58
92.1	04.4	41.0	72.2	79.2	61.3	16.7	04.9	67.7	19.6	91.9	37.8	59

	83°				84°				85°			
I'	T	E	C	M	T	E	C	M	T	E	C	M
0	5069.2	1920.5	7593.2	1438.4	5159.0	1980.4	7667.8	1471.7	5250.3	2041.7	7741.8	1505.3
1	70.7	21.5	94.4	38.9	60.5	81.4	69.0	72.2	51.8	42.7	43.0	05.9
2	72.1	22.5	95.7	39.5	62.0	82.4	70.2	72.8	53.3	43.8	44.2	06.4
3	73.6	23.5	96.9	40.1	63.5	83.4	71.5	73.4	54.9	44.8	45.5	07.0
4	75.1	24.5	98.2	40.6	65.0	84.4	72.7	73.9	56.4	45.9	46.7	07.6
5	76.6	25.5	99.4	41.2	66.6	85.4	74.0	74.5	57.9	46.9	47.9	08.1
6	78.1	26.4	7600.6	41.7	68.1	86.4	75.2	75.0	59.5	47.9	49.2	08.7
7	79.6	27.4	01.9	42.3	69.6	87.4	76.4	75.6	61.0	49.0	50.4	09.3
8	81.1	28.4	03.1	42.8	71.1	88.4	77.7	76.2	62.5	50.0	51.6	09.8
9	82.6	29.4	04.4	43.4	72.6	89.5	78.9	76.7	64.1	51.1	52.8	10.4
10	5084.0	1930.4	7605.6	1443.9	5174.1	1990.5	7680.1	1477.3	5265.6	2052.1	7754.1	1510.9
11	85.5	31.4	06.9	44.5	75.6	91.5	81.4	77.8	67.1	53.1	55.3	11.5
12	87.0	32.4	08.1	45.0	77.1	92.5	82.6	78.4	68.7	54.2	56.5	12.1
13	88.5	33.4	09.4	45.6	78.7	93.5	83.9	78.9	70.2	55.2	57.8	12.6
14	90.0	34.4	10.6	46.1	80.2	94.5	85.1	79.5	71.8	56.3	59.0	13.2
15	91.5	35.4	11.9	46.7	81.7	95.5	86.3	80.1	73.3	57.3	60.2	13.8
16	93.0	36.3	13.1	47.2	83.2	96.6	87.6	80.6	74.8	58.3	61.4	14.3
17	94.5	37.3	14.4	47.8	84.7	97.6	88.8	81.2	76.4	59.4	62.7	14.9
18	96.0	38.3	15.6	48.4	86.2	98.6	90.0	81.7	77.9	60.4	63.9	15.5
19	97.5	39.3	16.9	48.9	87.7	99.6	91.3	82.3	79.5	61.5	65.1	16.0
20	5099.0	1940.3	7618.1	1449.5	5189.3	2000.6	7692.5	1482.9	5281.0	2062.5	7766.3	1516.6
21	5100.4	41.3	19.3	50.0	90.8	01.7	93.7	83.4	82.5	63.6	67.6	17.2
22	01.9	42.3	20.6	50.6	92.3	02.7	95.0	84.0	84.1	64.6	68.8	17.7
23	03.4	43.3	21.8	51.1	93.8	03.7	96.2	84.5	85.6	65.7	70.0	18.3
24	04.9	44.3	23.1	51.7	95.3	04.7	97.4	85.1	87.2	66.7	71.2	18.8
25	06.4	45.3	24.3	52.2	96.8	05.7	98.7	85.7	88.7	67.7	72.5	19.4
26	07.9	46.3	25.6	52.8	98.4	06.8	99.9	86.2	90.3	68.8	73.7	20.0
27	09.4	47.3	26.8	53.3	99.9	07.8	7701.2	86.8	91.8	69.8	74.9	20.5
28	10.9	48.3	28.1	53.9	5201.4	08.8	02.4	87.3	93.3	70.9	76.1	21.1
29	12.4	49.3	29.3	54.4	02.9	09.8	03.6	87.9	94.9	71.9	77.4	21.7
30	5113.9	1950.3	7630.5	1455.0	5204.4	2010.8	7704.9	1488.5	5296.4	2073.0	7778.6	1522.2
31	15.4	51.2	31.8	55.6	06.0	11.9	06.1	89.0	98.0	74.0	79.8	22.8
32	16.9	52.2	33.0	56.1	07.5	12.9	07.3	89.6	99.5	75.1	81.0	23.4
33	18.4	53.2	34.3	56.7	09.0	13.9	08.6	90.1	5301.1	76.1	82.3	23.9
34	19.9	54.2	35.5	57.2	10.5	14.9	09.8	90.7	02.6	77.2	83.5	24.5
35	21.4	55.2	36.8	57.8	12.1	16.0	11.0	91.3	04.2	78.2	84.7	25.1
36	22.9	56.2	38.0	58.3	13.6	17.0	12.3	91.8	05.7	79.3	85.9	25.6
37	24.4	57.2	39.2	58.9	15.1	18.0	13.5	92.4	07.3	80.3	87.1	26.2
38	25.9	58.2	40.5	59.4	16.6	19.0	14.7	92.9	08.8	81.4	88.4	26.8
39	27.4	59.2	41.7	60.0	18.2	20.1	15.9	93.5	10.4	82.4	89.6	27.3
40	5128.9	1960.2	7643.0	1460.6	5219.7	2021.1	7717.2	1494.1	5311.9	2083.5	7790.8	1527.9
41	30.4	61.2	44.2	61.1	21.2	22.1	18.4	94.6	13.5	84.6	92.0	28.5
42	31.9	62.2	45.4	61.7	22.7	23.1	19.6	95.2	15.0	85.6	93.3	29.0
43	33.4	63.2	46.7	62.2	24.3	24.2	20.9	95.8	16.6	86.7	94.5	29.6
44	34.9	64.2	47.9	62.8	25.8	25.2	22.1	96.3	18.1	87.7	95.7	30.2
45	36.4	65.3	49.2	63.3	27.3	26.2	23.3	96.9	19.7	88.8	96.9	30.7
46	37.9	66.3	50.4	63.9	28.8	27.3	24.6	97.4	21.2	89.8	98.1	31.3
47	39.4	67.3	51.7	64.4	30.4	28.3	25.8	98.0	22.8	90.9	99.4	31.9
48	40.9	68.3	52.9	65.0	31.9	29.3	27.0	98.6	24.3	91.9	7800.6	32.4
49	42.4	69.3	54.1	65.6	33.4	30.3	28.3	99.1	25.9	93.0	01.8	33.0
50	5143.9	1970.3	7655.4	1466.1	5234.9	2031.4	7729.5	1499.7	5327.4	2094.1	7803.0	1533.6
51	45.4	71.3	56.6	66.7	36.5	32.4	30.7	1500.2	29.0	95.1	04.2	34.1
52	46.9	72.3	57.9	67.2	38.0	33.4	32.0	00.8	30.5	96.2	05.5	34.7
53	48.4	73.3	59.1	67.8	39.5	34.5	33.2	01.4	32.1	97.2	06.7	35.3
54	50.0	74.3	60.3	68.3	41.1	35.5	34.4	01.9	33.6	98.3	07.9	35.8
55	51.5	75.3	61.6	68.9	42.6	36.5	35.6	02.5	35.2	99.4	09.1	36.4
56	53.0	76.3	62.8	69.5	44.1	37.6	36.9	03.1	36.8	2100.4	10.3	37.0
57	54.5	77.3	64.1	70.0	45.7	38.6	38.1	03.6	38.3	01.5	11.6	37.5
58	56.0	78.3	65.3	70.6	47.2	39.6	39.3	04.2	39.9	02.5	12.8	38.1
59	57.5	79.3	66.5	71.1	48.7	40.7	40.6	04.7	41.4	03.6	14.0	38.7

86°				87°				88°				I
T	E	C	M	T	E	C	M	T	E	C	M	
5343.0	2104.7	7815.2	1539.2	5437.2	2169.2	7888.1	1573.5	5533.1	2235.5	7960.3	1608.1	0
44.5	05.7	16.4	39.8	38.8	70.3	89.3	74.1	34.7	36.6	61.5	08.7	1
46.1	06.8	17.7	40.4	40.4	71.4	90.5	74.7	36.3	37.7	62.7	09.2	2
47.7	07.8	18.9	41.0	42.0	72.5	91.7	75.2	37.9	38.9	63.9	09.8	3
49.2	08.9	20.1	41.5	43.6	73.6	92.9	75.8	39.5	40.0	65.1	10.4	4
50.8	10.0	21.3	42.1	45.2	74.7	94.1	76.4	41.1	41.1	66.3	11.0	5
52.3	11.0	22.5	42.7	46.7	75.8	95.3	77.0	42.7	42.2	67.5	11.6	6
53.9	12.1	23.8	43.2	48.3	76.9	96.5	77.5	44.3	43.3	68.7	12.1	7
55.5	13.2	25.0	43.8	49.9	78.0	97.7	78.1	46.0	44.5	69.9	12.7	8
57.0	14.2	26.2	44.4	51.5	79.1	98.9	78.7	47.6	45.6	71.1	13.3	9
53586	2115.3	7827.4	1544.9	5453.1	2180.2	7900.1	1579.3	5549.2	2246.7	7972.3	1613.9	10
60.1	16.4	28.6	45.5	54.7	81.3	01.4	79.8	50.8	47.8	73.5	14.5	11
61.7	17.4	29.8	46.1	56.3	82.4	02.6	80.4	52.4	49.0	74.7	15.0	12
63.3	18.5	31.1	46.6	57.9	83.4	03.8	81.0	54.0	50.1	75.9	15.6	13
64.8	19.6	32.3	47.2	59.5	84.5	05.0	81.5	55.7	51.2	77.1	16.2	14
66.4	20.6	33.5	47.8	61.0	85.6	06.2	82.1	57.3	52.3	78.3	16.8	15
68.0	21.7	34.7	48.4	62.6	86.7	07.4	82.7	58.9	53.5	79.5	17.4	16
69.5	22.8	35.9	48.9	64.2	87.8	08.6	83.3	60.5	54.6	80.7	17.9	17
71.1	23.9	37.1	49.5	65.8	88.9	09.8	83.8	62.1	55.7	81.9	18.5	18
72.7	24.9	38.4	50.1	67.4	90.0	11.0	84.4	63.7	56.8	83.0	19.1	19
5374.2	2126.0	7839.6	1550.6	5469.0	2191.1	7912.2	1585.0	5565.4	2258.0	7984.2	1619.7	20
75.8	27.1	40.8	51.2	70.6	92.2	13.4	85.6	67.0	59.1	85.4	20.3	21
77.4	28.1	42.0	51.8	72.2	93.3	14.6	86.1	68.6	60.2	86.6	20.8	22
78.9	29.2	43.2	52.3	73.8	94.4	15.8	86.7	70.2	61.4	87.8	21.4	23
80.5	30.3	44.4	52.9	75.4	95.5	17.0	87.3	71.8	62.5	89.0	22.0	24
82.1	31.4	45.6	53.5	77.0	96.6	18.2	87.9	73.5	63.6	90.2	22.6	25
83.6	32.4	46.9	54.1	78.6	97.7	19.4	88.4	75.1	64.8	91.4	23.2	26
85.2	33.5	48.1	54.6	80.2	98.8	20.6	89.0	76.7	65.9	92.6	23.7	27
86.8	34.6	49.3	55.2	81.8	99.9	21.8	89.6	78.3	67.0	93.8	24.3	28
88.3	35.7	50.5	55.8	83.4	2201.1	23.1	90.2	80.0	68.1	95.0	24.9	29
5389.9	2136.7	7851.7	1556.3	5484.9	2202.2	7924.3	1590.8	5581.6	2269.3	7996.2	1625.5	30
91.5	37.8	52.9	56.9	86.5	03.3	25.5	91.3	83.2	70.4	97.4	26.1	31
93.1	38.9	54.1	57.5	88.1	04.4	26.7	91.9	84.8	71.5	98.6	26.7	32
94.6	40.0	55.4	58.1	89.7	05.5	27.9	92.5	86.5	72.7	99.8	27.2	33
96.2	41.0	56.6	58.6	91.3	06.6	29.1	93.1	88.1	73.8	8001.0	27.8	34
97.8	42.1	57.8	59.2	92.9	07.7	30.3	93.6	89.7	75.0	02.2	28.4	35
99.3	43.2	59.0	59.8	94.5	08.8	31.5	94.2	91.3	76.1	03.4	29.0	36
5400.9	44.3	60.2	60.3	96.1	09.9	32.7	94.8	93.0	77.2	04.5	29.6	37
02.5	45.4	61.4	60.9	97.7	11.0	33.9	95.4	94.6	78.4	05.7	30.1	38
04.1	46.4	62.6	61.5	99.3	12.1	35.1	95.9	96.2	79.5	06.9	30.7	39
54056	2147.5	7863.8	1562.1	5500.9	2213.2	7936.3	1596.5	5597.8	2280.6	8008.1	1631.3	40
07.2	48.6	65.1	62.6	02.5	14.3	37.5	97.1	99.5	81.8	09.3	31.9	41
08.8	49.7	66.3	63.2	04.1	15.4	38.7	97.7	5601.1	82.9	10.5	32.5	42
10.4	50.8	67.5	63.8	05.7	16.5	39.9	98.3	02.7	84.1	11.7	33.1	43
12.0	51.9	68.7	64.3	07.3	17.7	41.1	98.8	04.4	85.2	12.9	33.6	44
13.5	52.9	69.9	64.9	09.0	18.8	42.3	99.4	06.0	86.3	14.1	34.2	45
15.1	54.0	71.1	65.5	10.6	19.9	43.5	1600.0	07.6	87.5	15.3	34.8	46
16.7	55.1	72.3	66.1	12.2	21.0	44.7	00.6	09.3	88.6	16.5	35.4	47
18.3	56.2	73.5	66.6	13.8	22.1	45.9	01.1	10.9	89.8	17.7	36.0	48
19.8	57.3	74.8	67.2	15.4	23.2	47.1	01.7	12.5	90.9	18.8	36.6	49
5421.4	2158.4	7876.0	1567.8	5517.0	2224.3	7948.3	1602.3	5614.2	2292.0	8020.0	1637.1	50
23.0	59.4	77.2	68.3	18.6	25.5	49.5	02.9	15.8	93.2	21.2	37.7	51
24.6	60.5	78.4	68.9	20.2	26.6	50.7	03.5	17.4	94.3	22.4	38.3	52
26.2	61.6	79.6	69.5	21.8	27.7	51.9	04.0	19.1	95.5	23.6	38.9	53
27.7	62.7	80.8	70.1	23.4	28.8	53.1	04.6	20.7	96.6	24.8	39.5	54
29.3	63.8	82.0	70.6	25.0	29.9	54.3	05.2	22.3	97.8	26.0	40.1	55
30.9	64.9	83.2	71.2	26.6	31.0	55.5	05.8	24.0	98.9	27.2	40.6	56
32.5	66.0	84.4	71.8	28.2	32.1	56.7	06.3	25.6	2300.1	28.4	41.2	57
34.1	67.1	85.6	72.4	29.8	33.3	57.9	06.9	27.2	01.2	29.6	41.8	58
35.7	68.1	86.9	72.9	31.4	34.4	59.1	07.5	28.9	02.4	30.7	42.4	59

	89°				90°				91°			
I	T	E	C	M	T	E	C	M	T	E	C	M
0	5630.5	2303.5	8031.9	1643.0	5729.7	2373.3	8102.9	1678.2	5830.5	2444.9	8173.4	1713.7
1	32.2	04.7	33.1	43.6	31.3	74.5	04.1	78.8	32.2	46.2	74.5	14.3
2	33.8	05.8	34.3	44.1	33.0	75.7	05.3	79.4	33.9	47.4	75.7	14.9
3	35.4	06.9	35.5	44.7	34.7	76.8	06.5	79.9	35.6	48.6	76.9	15.5
4	37.1	08.1	36.7	45.3	36.3	78.0	07.7	80.5	37.3	49.8	78.0	16.1
5	38.7	09.2	37.9	45.9	38.0	79.2	08.8	81.1	39.0	51.0	79.2	16.7
6	40.3	10.4	39.1	46.5	39.7	80.4	10.0	81.7	40.7	52.2	80.4	17.3
7	42.0	11.6	40.2	47.1	41.3	81.6	11.2	82.3	42.4	53.4	81.5	17.8
8	43.6	12.7	41.4	47.7	43.0	82.7	12.4	82.9	44.1	54.6	82.7	18.4
9	45.3	13.9	42.6	48.2	44.7	83.9	13.5	83.5	45.8	55.9	83.9	19.0
10	5646.9	2315.0	8043.8	1648.8	5746.3	2385.1	8114.7	1684.1	5847.5	2457.1	8185.0	1719.6
11	48.6	16.2	45.0	49.4	48.0	86.3	15.9	84.7	49.2	58.3	86.2	20.2
12	50.2	17.3	46.2	50.0	49.7	87.5	17.1	85.3	50.9	59.5	87.4	20.8
13	51.8	18.5	47.4	50.6	51.4	88.7	18.3	85.8	52.6	60.7	88.5	21.4
14	53.5	19.6	48.6	51.2	53.0	89.8	19.4	86.4	54.3	61.9	89.7	22.0
15	55.1	20.8	49.7	51.7	54.7	91.0	20.6	87.0	56.0	63.2	90.9	22.6
16	56.8	21.9	50.9	52.3	56.4	92.2	21.8	87.6	57.7	64.4	92.0	23.2
17	58.4	23.1	52.1	52.9	58.1	93.4	23.0	88.2	59.4	65.6	93.2	23.8
18	60.1	24.3	53.3	53.5	59.7	94.6	24.1	88.8	61.1	66.8	94.3	24.4
19	61.7	25.4	54.5	54.1	61.4	95.8	25.3	89.4	62.9	68.0	95.5	25.0
20	5663.4	2326.6	8055.7	1654.7	5763.1	2397.0	8126.5	1690.0	5864.6	2469.3	8196.7	1725.6
21	65.0	27.7	56.9	55.3	64.8	98.2	27.7	90.6	66.3	70.5	97.8	26.2
22	66.7	28.9	58.0	55.8	66.4	99.4	28.8	91.2	68.0	71.7	99.0	26.8
23	68.3	30.0	59.2	56.4	68.1	2400.5	30.0	91.8	69.7	72.9	8200.2	27.4
24	70.0	31.2	60.4	57.0	69.8	01.7	31.2	92.3	71.4	74.1	01.3	28.0
25	71.6	32.4	61.6	57.6	71.5	02.9	32.4	92.9	73.1	75.4	02.5	28.6
26	73.3	33.5	62.8	58.2	73.1	04.1	33.5	93.5	74.8	76.6	03.7	29.2
27	74.9	34.7	64.0	58.8	74.8	05.3	34.7	94.1	76.5	77.8	04.8	29.8
28	76.6	35.8	65.1	59.4	76.5	06.5	35.9	94.7	78.2	79.0	06.0	30.4
29	78.2	37.0	66.3	59.9	78.2	07.7	37.1	95.3	79.9	80.3	07.2	31.0
30	5679.9	2338.2	8067.5	1660.5	5779.9	2408.9	8138.2	1695.9	5881.7	2481.5	8208.3	1731.6
31	81.5	39.3	68.7	61.1	81.6	10.1	39.4	96.5	83.4	82.7	09.5	32.2
32	83.2	40.5	69.9	61.7	83.2	11.3	40.6	97.1	85.1	83.9	10.6	32.8
33	84.8	41.7	71.1	62.3	84.9	12.5	41.7	97.7	86.8	85.2	11.8	33.4
34	86.5	42.8	72.2	62.9	86.6	13.7	42.9	98.3	88.5	86.4	13.0	34.0
35	88.1	44.0	73.4	63.5	88.3	14.9	44.1	98.9	90.2	87.6	14.1	34.6
36	89.8	45.2	74.6	64.1	90.0	16.1	45.3	99.4	91.9	88.8	15.3	35.1
37	91.4	46.3	75.8	64.6	91.7	17.3	46.4	1700.0	93.6	90.1	16.5	35.7
38	93.1	47.5	77.0	65.2	93.3	18.5	47.6	00.6	95.4	91.3	17.6	36.3
39	94.8	48.7	78.2	65.8	95.0	19.7	48.8	01.2	97.1	92.5	18.8	36.9
40	5696.4	2349.8	8079.3	1666.4	5796.7	2420.9	8150.0	1701.8	5898.8	2493.8	8219.9	1737.5
41	98.1	51.0	80.5	67.0	98.4	22.1	51.1	02.4	5900.5	95.0	21.1	38.1
42	99.7	52.2	81.7	67.6	5800.1	23.3	52.3	03.0	02.2	96.2	22.3	38.7
43	5701.4	53.3	82.9	68.2	01.8	24.5	53.5	03.6	03.9	97.5	23.4	39.3
44	03.0	54.5	84.1	68.8	03.5	25.7	54.6	04.2	05.7	98.7	24.6	39.9
45	04.7	55.7	85.3	69.3	05.1	26.9	55.8	04.8	07.4	99.9	25.7	40.5
46	06.4	56.9	86.4	69.9	06.8	28.1	57.0	05.4	09.1	2501.2	26.9	41.1
47	08.0	58.0	87.6	70.5	08.5	29.3	58.2	06.0	10.8	02.4	28.1	41.7
48	09.7	59.2	88.8	71.1	10.2	30.5	59.3	06.6	12.5	03.6	29.2	42.3
49	11.3	60.4	90.0	71.7	11.9	31.7	60.5	07.2	14.3	04.9	30.4	42.9
50	5713.0	2361.5	8091.2	1672.3	5813.6	2432.9	8161.7	1707.7	5916.0	2506.1	8231.5	1743.5
51	14.7	62.7	92.3	72.9	15.3	34.1	62.8	08.3	17.7	07.3	32.7	44.1
52	16.3	63.9	93.5	73.5	17.0	35.3	64.0	08.9	19.4	08.6	33.9	44.7
53	18.0	65.1	94.7	74.1	18.7	36.5	65.2	09.5	21.2	09.8	35.0	45.3
54	19.7	66.2	95.9	74.6	20.4	37.7	66.3	10.1	22.9	11.1	36.2	45.9
55	21.3	67.4	97.1	75.2	22.1	38.9	67.5	10.7	24.6	12.3	37.3	46.5
56	23.0	68.6	98.2	75.8	23.8	40.1	68.7	11.3	26.3	13.5	38.5	47.1
57	24.7	69.8	99.4	76.4	25.4	41.3	69.8	11.9	28.0	14.8	39.7	47.7
58	26.3	70.9	8100.6	77.0	27.1	42.5	71.0	12.5	29.8	16.0	40.8	48.3
59	28.0	72.1	01.8	77.6	28.8	43.7	72.2	13.1	31.5	17.3	42.0	48.9

92°				93°				94°				
T	E	C	M	T	E	C	M	T	E	C	M	′
5933.2	2518.5	8243.1	1749.5	6037.8	2594.0	8312.3	1785.6	6144.3	2671.6	8380.8	1822.0	0
35.0	19.7	44.3	50.1	39.6	95.3	13.4	86.2	46.1	72.9	81.9	22.6	1
36.7	21.0	45.4	50.7	41.3	96.6	14.6	86.8	47.9	74.2	83.1	23.3	2
38.4	22.2	46.6	51.3	43.1	97.9	15.7	87.4	49.7	75.6	84.2	23.9	3
40.1	23.5	47.8	51.9	44.8	99.1	16.9	88.0	51.5	76.9	85.3	24.5	4
41.9	24.7	48.9	52.5	46.6	2600.4	18.0	88.6	53.3	78.2	86.5	25.1	5
43.6	26.0	50.1	53.1	48.4	01.7	19.2	89.2	55.1	79.5	87.6	25.7	6
45.3	27.2	51.2	53.7	50.1	03.0	20.3	89.9	56.9	80.8	88.8	26.3	7
47.1	28.5	52.4	54.3	51.9	04.3	21.5	90.5	58.6	82.1	89.9	26.9	8
48.8	29.7	53.5	54.9	53.6	05.5	22.6	91.1	60.4	83.4	91.0	27.5	9
5950.5	2531.0	8254.7	1755.5	6055.4	2606.8	8323.7	1791.7	6162.2	2684.8	8392.2	1828.1	10
52.3	32.2	55.9	56.1	57.2	08.1	24.9	92.3	64.0	86.1	93.3	28.7	11
54.0	33.5	57.0	56.7	58.9	09.4	26.0	92.9	65.8	87.4	94.4	29.4	12
55.7	34.7	58.2	57.3	60.7	10.7	27.2	93.5	67.6	88.7	95.6	30.0	13
57.5	36.0	59.3	57.9	62.5	12.0	28.3	94.1	69.4	90.0	96.7	30.6	14
59.2	37.2	60.5	58.5	64.2	13.2	29.5	94.7	71.2	91.3	97.8	31.2	15
60.9	38.5	61.6	59.1	66.0	14.5	30.6	95.3	73.0	92.7	99.0	31.8	16
62.7	39.7	62.8	59.7	67.8	15.8	31.8	95.9	74.8	94.0	8400.1	32.4	17
64.4	41.0	63.9	60.3	69.5	17.1	32.9	96.5	76.6	95.3	01.2	33.0	18
66.1	42.2	65.1	60.9	71.3	18.4	34.0	97.1	78.4	96.6	02.4	33.6	19
5967.9	2543.5	8266.3	1761.5	6073.1	2619.7	8335.2	1797.7	6180.2	2697.9	8403.5	1834.2	20
69.6	44.7	67.4	62.1	74.8	21.0	36.3	98.3	82.0	99.3	04.6	34.9	21
71.3	46.0	68.6	62.7	76.6	22.2	37.5	98.9	83.8	2700.6	05.8	35.5	22
73.1	47.2	69.7	63.3	78.4	23.5	38.6	99.5	85.7	01.9	06.9	36.1	23
74.8	48.5	70.9	63.9	80.2	24.8	39.8	1800.2	87.5	03.2	08.0	36.7	24
76.6	49.7	72.0	64.5	81.9	26.1	40.9	00.8	89.3	04.6	09.2	37.3	25
78.3	51.0	73.2	65.1	83.7	27.4	42.1	01.4	91.1	05.9	10.3	37.9	26
80.0	52.2	74.3	65.7	85.5	28.7	43.2	02.0	92.9	07.2	11.4	38.5	27
81.8	53.5	75.5	66.3	87.2	30.0	44.3	02.6	94.7	08.5	12.6	39.1	28
83.5	54.8	76.6	66.9	89.0	31.3	45.5	03.2	96.5	09.9	13.7	39.7	29
5985.3	2556.0	8277.8	1767.5	6090.8	2632.6	8346.6	1803.8	6198.3	2711.2	8414.8	1840.4	30
87.0	57.3	78.9	68.1	92.6	33.9	47.8	04.4	6200.1	12.5	16.0	41.0	31
88.8	58.5	80.1	68.7	94.3	35.2	48.9	05.0	01.9	13.9	17.1	41.6	32
90.5	59.8	81.2	69.3	96.1	36.5	50.0	05.6	03.7	15.2	18.2	42.2	33
92.2	61.1	82.4	69.9	97.9	37.7	51.2	06.2	05.5	16.5	19.3	42.8	34
94.0	62.3	83.5	70.5	99.7	39.0	52.3	06.8	07.4	17.8	20.5	43.4	35
95.7	63.6	84.7	71.1	6101.5	40.3	53.5	07.4	09.2	19.2	21.6	44.0	36
97.5	64.8	85.9	71.7	03.2	41.6	54.6	08.0	11.0	20.5	22.7	44.6	37
99.2	66.1	87.0	72.3	05.0	42.9	55.8	08.6	12.8	21.8	23.9	45.3	38
6001.0	67.4	88.2	72.9	06.8	44.2	56.9	09.3	14.6	23.2	25.0	45.9	39
6002.7	2568.6	8289.3	1773.5	6108.6	2645.5	8358.0	1809.9	6216.4	2724.5	8426.1	1846.5	40
04.5	69.9	90.5	74.1	10.4	46.8	59.2	10.5	18.2	25.8	27.3	47.1	41
06.2	71.2	91.6	74.8	12.1	48.1	60.3	11.1	20.0	27.2	28.4	47.7	42
08.0	72.4	92.8	75.4	13.9	49.4	61.5	11.7	21.9	28.5	29.5	48.3	43
09.7	73.7	93.9	76.0	15.7	50.7	62.6	12.3	23.7	29.8	30.6	48.9	44
11.5	75.0	95.1	76.6	17.5	52.0	63.7	12.9	25.5	31.2	31.8	49.5	45
13.2	76.2	96.2	77.2	19.3	53.3	64.9	13.5	27.3	32.5	32.9	50.2	46
15.0	77.5	97.4	77.8	21.1	54.6	66.0	14.1	29.1	33.9	34.0	50.8	47
16.7	78.8	98.5	78.4	22.8	55.9	67.1	14.7	30.9	35.2	35.2	51.4	48
18.5	80.0	99.7	79.0	24.6	57.2	68.3	15.3	32.8	36.5	36.3	52.0	49
6020.2	2581.3	8300.8	1779.6	6126.4	2658.5	8369.4	1815.9	6234.6	2737.9	8437.4	1852.6	50
22.0	82.6	01.9	80.2	28.2	59.8	70.6	16.6	36.4	39.2	38.5	53.2	51
23.7	83.9	03.1	80.8	30.0	61.2	71.7	17.2	38.2	40.6	39.7	53.8	52
25.5	85.1	04.2	81.4	31.8	62.5	72.8	17.8	40.0	41.9	40.8	54.5	53
27.2	86.4	05.4	82.0	33.6	63.8	74.0	18.4	41.9	43.2	41.9	55.1	54
29.0	87.7	06.5	82.6	35.3	65.1	75.1	19.0	43.7	44.6	43.0	55.7	55
30.8	88.9	07.7	83.2	37.1	66.4	76.3	19.6	45.5	45.9	44.2	56.3	56
32.5	90.2	08.8	83.8	38.9	67.7	77.4	20.2	47.3	47.3	45.3	56.9	57
34.3	91.5	10.0	84.4	40.7	69.0	78.5	20.8	49.2	48.6	46.4	57.5	58
36.0	92.8	11.1	85.0	42.5	70.3	79.7	21.4	51.0	50.0	47.6	58.1	59

	95°				96°				97°			
′	T	E	C	M	T	E	C	M	T	E	C	M
0	6252.8	2757.3	8448.7	1858.8	6363.4	2833.2	8515.9	1895.8	6476.2	2917.3	8582.5	1933.1
1	54.6	52.7	49.8	59.4	65.3	34.6	17.0	96.4	78.1	18.7	83.6	33.7
2	56.5	54.0	50.9	60.0	67.1	35.9	18.2	97.0	80.0	20.2	84.7	34.3
3	58.3	55.3	52.1	60.6	69.0	37.3	19.3	97.6	81.9	21.6	85.8	34.9
4	60.1	56.7	53.2	61.2	70.9	38.7	20.4	98.2	83.8	23.0	86.9	35.6
5	62.0	58.0	54.3	61.8	72.7	40.1	21.5	98.9	85.7	24.4	88.0	36.2
6	63.8	59.4	55.4	62.4	74.6	41.5	22.6	99.5	87.6	25.8	89.1	36.8
7	65.6	60.7	56.6	63.1	76.5	42.9	23.7	1900.1	89.5	27.3	90.2	37.4
8	67.4	62.1	57.7	63.7	78.3	44.3	24.8	00.7	91.4	28.7	91.3	38.1
9	69.3	63.4	58.8	64.3	80.2	45.7	25.9	01.3	93.3	30.1	92.4	38.7
10	6271.1	2764.8	8459.9	1864.9	6382.1	2847.0	8527.1	1902.0	6495.2	2931.6	8593.5	1939.3
11	72.9	66.1	61.1	65.5	83.9	48.4	28.2	02.6	97.1	33.0	94.6	39.9
12	74.8	67.5	62.2	66.1	85.8	49.8	29.3	03.2	99.0	34.4	95.7	40.6
13	76.6	68.9	63.3	66.7	87.7	51.2	30.4	03.8	6500.9	35.8	96.9	41.2
14	78.4	70.2	64.4	67.4	89.5	52.6	31.5	04.4	02.8	37.3	98.0	41.8
15	80.3	71.6	65.6	68.0	91.4	54.0	32.6	05.1	04.7	38.7	99.1	42.4
16	82.1	72.9	66.7	68.6	93.3	55.4	33.7	05.7	06.6	40.1	8600.2	43.1
17	83.9	74.3	67.8	69.2	95.1	56.8	34.9	06.3	08.5	41.6	01.3	43.7
18	85.8	75.6	68.9	69.8	97.0	58.2	36.0	06.9	10.5	43.0	02.4	44.3
19	87.6	77.0	70.0	70.4	98.9	59.6	37.1	07.5	12.4	44.4	03.5	44.9
20	6289.4	2778.4	8471.2	1871.1	6400.8	2861.0	8538.2	1908.2	6514.3	2945.9	8604.6	1945.6
21	91.3	79.7	72.3	71.7	02.6	62.4	39.3	08.8	16.2	47.3	05.7	46.2
22	93.1	81.1	73.4	72.3	04.5	63.8	40.4	09.4	18.1	48.7	06.8	46.8
23	95.0	82.4	74.5	72.9	06.4	65.2	41.5	10.0	20.0	50.2	07.9	47.4
24	96.8	83.8	75.7	73.5	08.3	66.6	42.6	10.7	21.9	51.6	09.0	48.1
25	98.6	85.1	76.8	74.1	10.1	68.0	43.7	11.3	23.8	53.1	10.1	48.7
26	6300.5	86.5	77.9	74.8	12.0	69.4	44.9	11.9	25.8	54.5	11.2	49.3
27	02.3	87.9	79.0	75.4	13.9	70.8	46.0	12.5	27.7	55.9	12.3	50.0
28	04.2	89.2	80.1	76.0	15.8	72.2	47.1	13.1	29.6	57.4	13.4	50.6
29	06.0	90.6	81.3	76.6	17.7	73.6	48.2	13.8	31.5	58.8	14.5	51.2
30	6307.9	2792.0	8482.4	1877.2	6419.5	2875.0	8549.3	1914.4	6533.4	2960.2	8615.6	1951.8
31	09.7	93.3	83.5	77.8	21.4	76.4	50.4	15.0	35.3	61.7	16.7	52.5
32	11.5	94.7	84.6	78.5	23.3	77.8	51.5	15.6	37.2	63.1	17.8	53.1
33	13.4	96.1	85.7	79.1	25.2	79.2	52.6	16.2	39.2	64.6	18.9	53.7
34	15.2	97.4	86.9	79.7	27.1	80.6	53.7	16.9	41.1	66.0	20.0	54.3
35	17.1	98.8	88.0	80.3	28.9	82.0	54.8	17.5	43.0	67.5	21.1	55.0
36	18.9	2800.2	89.1	80.9	30.8	83.4	56.0	18.1	44.9	68.9	22.1	55.6
37	20.8	01.5	90.2	81.5	32.7	84.8	57.1	18.7	46.8	70.4	23.2	56.2
38	22.6	02.9	91.3	82.2	34.6	86.2	58.2	19.4	48.8	71.8	24.3	56.8
39	24.5	04.3	92.5	82.8	36.5	87.6	59.3	20.0	50.7	73.3	25.4	57.5
40	6326.3	2805.6	8493.6	1883.4	6438.4	2889.0	8560.4	1920.6	6552.6	2974.7	8626.5	1958.1
41	28.2	07.0	94.7	84.0	40.2	90.4	61.5	21.2	54.5	76.1	27.6	58.7
42	30.0	08.4	95.8	84.6	42.1	91.8	62.6	21.8	56.5	77.6	28.7	59.4
43	31.9	09.8	96.9	85.3	44.0	93.2	63.7	22.5	58.4	79.0	29.8	60.0
44	33.7	11.1	98.1	85.9	45.9	94.6	64.8	23.1	60.3	80.5	30.9	60.6
45	35.6	12.5	99.2	86.5	47.8	96.1	65.9	23.7	62.2	81.9	32.0	61.2
46	37.4	13.9	8500.3	87.1	49.7	97.5	67.0	24.3	64.2	83.4	33.1	61.9
47	39.3	15.3	01.4	87.7	51.6	98.9	68.1	25.0	66.1	84.8	34.2	62.5
48	41.1	16.6	02.5	88.3	53.5	2900.3	69.2	25.6	68.0	86.3	35.3	63.1
49	43.0	18.0	03.6	89.0	55.4	01.7	70.3	26.2	70.0	87.8	36.4	63.7
50	6344.8	2819.4	8504.8	1889.6	6457.2	2903.1	8571.5	1926.8	6571.9	2989.2	8637.5	1964.4
51	46.7	20.8	05.9	90.2	59.1	04.5	72.6	27.5	73.8	90.7	38.6	65.0
52	48.6	22.1	07.0	90.8	61.0	06.0	73.7	28.1	75.7	92.1	39.7	65.6
53	50.4	23.5	08.1	91.4	62.9	07.4	74.8	28.7	77.7	93.6	40.8	66.3
54	52.3	24.9	09.2	92.1	64.8	08.8	75.9	29.3	79.6	95.0	41.9	66.9
55	54.1	26.3	10.3	92.7	66.7	10.2	77.0	29.9	81.5	96.5	43.0	67.5
56	56.0	27.7	11.5	93.3	68.6	11.6	78.1	30.6	83.5	97.9	44.1	68.1
57	57.8	29.0	12.6	93.9	70.5	13.0	79.2	31.2	85.4	99.4	45.2	68.8
58	59.7	30.4	13.7	94.5	72.4	14.5	80.3	31.8	87.3	3000.9	46.3	69.4
59	61.6	31.8	14.8	95.1	74.3	15.9	81.4	32.4	89.3	02.3	47.3	70.0

Δ	T	E	C	M
98° 0′	6591.2	3003.8	8648.4	1970.7
10	6610.6	18.4	53.4	77.0
20	30.1	33.1	70.3	83.3
30	49.6	47.9	81.2	89.6
40	69.2	62.8	92.0	95.9
50	88.8	77.7	8702.9	2002.2
99° 0	6708.6	92.7	13.7	08.5
10	28.4	3107.7	24.5	14.9
20	48.2	22.9	35.3	21.2
30	68.1	38.1	46.1	27.6
40	88.1	53.3	56.9	33.9
50	6808.2	68.7	67.6	40.3
100° 0	6828.3	3184.1	8778.3	2046.7
10	48.5	99.6	89.0	53.1
20	68.8	3215.1	99.7	59.5
30	89.2	30.8	8810.4	65.9
40	6909.6	46.5	21.0	72.3
50	30.1	62.3	31.7	78.7
101° 0	50.6	78.1	42.3	85.1
10	71.3	94.1	52.9	91.6
20	92.0	3310.1	63.4	98.0
30	7012.7	26.1	74.0	2104.5
40	33.6	42.3	84.5	10.9
50	54.5	58.5	95.0	17.4
102° 0	7075.5	3374.9	8905.5	2123.9
10	96.6	91.2	16.0	30.3
20	7117.8	3407.7	26.5	36.8
30	39.0	24.3	36.9	43.3
40	60.3	40.9	47.4	49.8
50	81.7	57.6	57.8	56.3
103° 0	7203.2	74.4	68.1	62.9
10	24.7	91.3	78.5	69.4
20	46.3	3508.2	88.9	75.9
30	68.0	25.2	99.2	82.5
40	89.8	42.4	9009.5	89.0
50	7311.7	59.6	19.8	95.6
104° 0	7333.6	3576.8	9030.1	2202.1
10	55.6	94.2	40.3	08.7
20	77.8	3611.7	50.5	15.3
30	99.9	29.2	60.7	21.9
40	7422.2	46.8	70.9	28.5
50	44.6	64.5	81.1	35.1
105° 0	67.0	82.3	91.3	41.7
10	89.6	3700.2	9101.4	48.3
20	7512.2	18.2	11.5	54.9
30	34.9	36.2	21.6	61.5
40	57.7	54.4	31.7	68.2
50	80.5	72.6	41.8	74.8
106° 0	7603.5	3791.0	9151.8	2281.5
10	26.6	3809.4	61.8	88.1
20	49.7	27.9	71.8	94.8
30	72.9	46.5	81.8	2301.4
40	96.3	65.2	91.8	08.1
50	7719.7	84.0	9201.7	14.8
107° 0	43.2	3902.9	11.6	21.5
10	66.8	21.9	21.5	28.2
20	90.5	40.9	31.4	34.9
30	7814.3	60.1	41.3	41.7
40	38.1	79.4	51.1	48.4
50	62.1	98.7	61.0	55.1

Δ	T	E	C	M
108° 0′	7886.2	4018.2	9270.8	2361.8
10	7910.4	37.8	80.6	68.6
20	34.6	57.4	90.3	75.3
30	59.0	77.2	9300.1	82.1
40	83.4	97.1	09.8	88.9
50	8008.0	4117.0	19.5	95.8
109° 0	32.7	37.1	29.2	2402.4
10	57.4	57.3	38.9	09.2
20	82.3	77.5	48.5	16.0
30	8107.3	97.9	58.1	22.8
40	32.3	4218.4	67.8	29.6
50	57.5	39.0	77.3	36.4
110° 0	8182.8	4259.7	9387.0	2443.3
10	8208.2	80.5	96.5	50.1
20	33.7	4301.4	9406.0	56.9
30	59.3	22.4	15.5	63.8
40	85.0	43.6	25.0	70.6
50	8310.8	64.8	34.5	77.5
111° 0	36.7	86.1	43.9	84.3
10	62.7	4407.6	53.3	91.2
20	88.9	29.2	62.8	98.1
30	8415.1	50.9	72.1	2504.9
40	41.5	72.7	81.5	11.9
50	68.0	94.6	90.9	18.8
112° 0	8494.6	4516.6	9500.2	2525.7
10	8521.3	38.8	09.5	32.6
20	48.1	61.1	18.8	39.5
30	75.0	83.4	28.1	46.4
40	8602.1	4606.0	37.3	53.4
50	29.3	28.6	46.5	60.3
113° 0	56.6	51.3	55.7	67.2
10	84.0	74.2	64.9	74.2
20	8711.5	97.2	74.1	81.2
30	39.2	4720.3	83.3	88.1
40	67.0	43.6	92.4	95.1
50	94.9	66.9	9601.5	2602.1
114° 0	8822.9	4790.4	9610.6	2609.1
10	51.0	4814.1	19.6	16.1
20	79.3	37.8	28.7	23.1
30	8907.7	61.7	37.7	30.1
40	36.3	85.7	46.7	37.1
50	64.9	4909.9	55.7	44.1
115° 0	93.8	34.1	64.7	51.1
10	9022.7	58.6	73.6	58.1
20	51.7	83.1	82.5	65.2
30	80.9	5007.8	91.4	72.2
40	9110.3	32.6	9700.3	79.3
50	39.8	57.6	09.2	86.3
116° 0	9169.4	5082.7	9718.0	2693.4
10	99.1	5107.9	26.9	2700.5
20	9229.0	33.3	35.7	07.5
30	59.0	58.8	44.4	14.6
40	89.2	84.5	53.2	21.7
50	9319.5	5210.3	61.9	28.8
117° 0	49.9	36.2	70.7	35.9
10	80.5	62.3	79.4	43.0
20	9411.3	88.6	88.0	50.1
30	42.2	5315.0	96.7	57.3
40	73.2	41.5	9805.3	64.4
50	9504.4	68.2	13.9	71.5

VALUE FOR A 1°CURVE	DEGREE OF CURVE											VALUE FOR A 1°CURVE
	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	
100	.00	.00	.00	.01	.01	.01	.01	.01	.01	.01	.02	.02	100
200	.00	.01	.01	.01	.01	.02	.02	.02	.03	.03	.03	.03	200
300	.01	.01	.01	.02	.02	.03	.03	.03	.04	.04	.05	.05	300
400	.01	.01	.02	.02	.03	.03	.04	.05	.05	.06	.06	.07	400
500	.01	.02	.02	.03	.04	.04	.05	.06	.06	.07	.08	.08	500
600	.01	.02	.03	.04	.04	.05	.06	.07	.08	.08	.09	.10	600
700	.01	.02	.03	.04	.05	.06	.07	.08	.09	.10	.11	.12	700
800	.02	.03	.04	.05	.06	.07	.08	.09	.10	.11	.12	.13	800
900	.02	.03	.04	.05	.07	.08	.09	.10	.11	.12	.14	.15	900
1000	.02	.03	.05	.06	.07	.09	.10	.11	.13	.14	.15	.16	1000
1100	.02	.04	.05	.07	.08	.10	.11	.12	.14	.15	.17	.18	1100
1200	.02	.04	.06	.07	.09	.10	.12	.14	.15	.17	.18	.20	1200
1300	.02	.04	.06	.08	.10	.11	.13	.15	.16	.18	.20	.21	1300
1400	.03	.05	.07	.09	.10	.12	.14	.16	.18	.19	.21	.23	1400
1500	.03	.05	.07	.09	.11	.13	.15	.17	.19	.21	.23	.25	1500
1600	.03	.05	.08	.10	.12	.14	.16	.18	.20	.22	.24	.26	1600
1700	.03	.06	.08	.10	.13	.15	.17	.19	.21	.23	.26	.28	1700
1800	.03	.06	.09	.11	.13	.16	.18	.20	.23	.25	.27	.30	1800
1900	.04	.06	.09	.12	.14	.17	.19	.21	.24	.26	.29	.31	1900
2000	.04	.07	.10	.12	.15	.17	.20	.23	.25	.28	.30	.33	2000
2100	.04	.07	.10	.13	.16	.18	.21	.24	.26	.29	.32	.35	2100
2200	.04	.07	.10	.13	.16	.19	.22	.25	.28	.30	.33	.36	2200
2300	.04	.08	.11	.14	.17	.20	.23	.26	.29	.32	.35	.38	2300
2400	.05	.08	.11	.15	.18	.21	.24	.27	.30	.33	.36	.39	2400
2500	.05	.09	.12	.15	.19	.22	.25	.28	.31	.35	.38	.41	2500
2600	.05	.09	.12	.16	.19	.23	.26	.29	.33	.36	.39	.43	2600
2700	.05	.09	.13	.16	.20	.24	.27	.30	.34	.37	.41	.44	2700
2800	.05	.10	.13	.17	.21	.24	.28	.32	.35	.39	.42	.46	2800
2900	.06	.10	.14	.18	.21	.25	.29	.33	.36	.40	.44	.48	2900
3000	.06	.10	.14	.18	.22	.26	.30	.34	.38	.42	.45	.49	3000
3100	.06	.11	.15	.19	.23	.27	.31	.35	.39	.43	.47	.51	3100
3200	.06	.11	.15	.19	.24	.28	.32	.36	.40	.44	.48	.53	3200
3300	.06	.11	.16	.20	.24	.29	.33	.37	.42	.46	.50	.54	3300
3400	.06	.12	.16	.21	.25	.30	.34	.38	.43	.47	.52	.56	3400
3500	.07	.12	.17	.21	.26	.30	.35	.40	.44	.49	.53	.58	3500
3600	.07	.12	.17	.22	.27	.31	.36	.41	.45	.50	.55	.59	3600
3700	.07	.13	.18	.23	.27	.32	.37	.42	.47	.51	.56	.61	3700
3800	.07	.13	.18	.23	.28	.33	.38	.43	.48	.53	.58	.62	3800
3900	.07	.13	.19	.24	.29	.34	.39	.44	.49	.54	.59	.64	3900
4000	.08	.14	.19	.24	.30	.35	.40	.45	.50	.55	.61	.66	4000
4100	.08	.14	.20	.25	.30	.36	.41	.46	.52	.57	.62	.67	4100
4200	.08	.14	.20	.26	.31	.37	.42	.47	.53	.58	.64	.69	4200
4300	.08	.15	.20	.26	.32	.37	.43	.49	.54	.60	.65	.71	4300
4400	.08	.15	.21	.27	.33	.38	.44	.50	.55	.61	.67	.72	4400
4500	.09	.15	.21	.27	.33	.39	.45	.51	.57	.62	.68	.74	4500
4600	.09	.16	.22	.28	.34	.40	.46	.52	.58	.64	.70	.76	4600
4700	.09	.16	.22	.29	.35	.41	.47	.53	.59	.65	.71	.77	4700
4800	.09	.16	.23	.29	.36	.42	.48	.54	.60	.67	.73	.79	4800
4900	.09	.17	.23	.30	.36	.43	.49	.55	.62	.68	.74	.81	4900
5000	.10	.17	.24	.30	.37	.44	.50	.56	.63	.69	.76	.82	5000
5100	.10	.17	.24	.31	.38	.44	.51	.58	.64	.71	.77	.84	5100
5200	.10	.18	.25	.32	.38	.45	.52	.59	.65	.72	.79	.85	5200
5300	.10	.18	.25	.32	.39	.46	.53	.60	.67	.73	.80	.87	5300
5400	.10	.18	.26	.33	.40	.47	.54	.61	.68	.75	.82	.89	5400
5500	.10	.19	.26	.34	.41	.48	.55	.62	.69	.76	.83	.90	5500
5600	.11	.19	.27	.34	.41	.49	.56	.63	.70	.78	.85	.92	5600
5700	.11	.19	.27	.35	.42	.50	.57	.64	.72	.79	.86	.94	5700
5800	.11	.20	.28	.35	.43	.51	.58	.65	.73	.80	.88	.95	5800
5900	.11	.20	.28	.36	.44	.51	.59	.67	.74	.82	.89	.97	5900
6000	.11	.20	.29	.37	.44	.52	.60	.68	.76	.83	.91	.99	6000

VALUE FOR A 1° CURVE	DEGREE OF CURVE												VALUE FOR A 1° CURVE
	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	
6100	.12	.21	.29	.37	.45	.53	.61	.69	.77	.85	.92	1.00	6100
6200	.12	.21	.30	.38	.46	.54	.62	.70	.78	.86	.94	1.02	6200
6300	.12	.21	.30	.38	.47	.55	.63	.71	.79	.87	.95	1.04	6300
6400	.12	.22	.30	.39	.47	.56	.64	.72	.81	.89	.97	1.05	6400
6500	.12	.22	.31	.40	.48	.57	.65	.73	.82	.90	.98	1.07	6500
6600	.13	.22	.31	.40	.49	.57	.66	.75	.83	.91	1.00	1.09	6600
6700	.13	.23	.32	.41	.50	.58	.67	.76	.84	.93	1.01	1.10	6700
6800	.13	.23	.32	.41	.50	.59	.68	.77	.86	.94	1.03	1.12	6800
6900	.13	.23	.33	.42	.51	.60	.69	.78	.87	.96	1.05	1.13	6900
7000	.13	.24	.33	.43	.52	.61	.70	.79	.88	.97	1.06	1.15	7000
7100	.13	.24	.34	.43	.53	.62	.71	.80	.89	.98	1.08	1.17	7100
7200	.14	.25	.34	.44	.53	.63	.72	.81	.91	1.00	1.09	1.18	7200
7300	.14	.25	.35	.44	.54	.64	.73	.82	.92	1.01	1.11	1.20	7300
7400	.14	.25	.35	.45	.55	.64	.74	.84	.93	1.03	1.12	1.22	7400
7500	.14	.26	.36	.46	.56	.65	.75	.85	.94	1.04	1.14	1.23	7500
7600	.14	.26	.36	.46	.56	.66	.76	.86	.96	1.05	1.15	1.25	7600
7700	.15	.26	.37	.47	.57	.67	.77	.87	.97	1.07	1.17	1.26	7700
7800	.15	.27	.37	.48	.58	.68	.78	.88	.98	1.08	1.18	1.28	7800
7900	.15	.27	.38	.48	.58	.69	.79	.89	.99	1.09	1.20	1.30	7900
8000	.15	.27	.38	.49	.59	.70	.80	.90	1.01	1.11	1.21	1.32	8000
8200	.16	.28	.39	.50	.61	.71	.82	.93	1.03	1.14	1.24	1.35	8200
8400	.16	.29	.40	.51	.62	.73	.84	.95	1.06	1.16	1.27	1.38	8400
8600	.16	.29	.41	.52	.64	.75	.86	.97	1.08	1.19	1.30	1.41	8600
8800	.17	.30	.42	.54	.65	.77	.88	.99	1.11	1.22	1.33	1.45	8800
9000	.17	.31	.43	.55	.67	.78	.90	1.02	1.13	1.25	1.36	1.48	9000
9200	.18	.31	.44	.56	.68	.80	.92	1.04	1.16	1.28	1.39	1.51	9200
9400	.18	.32	.45	.57	.70	.82	.94	1.06	1.18	1.30	1.42	1.55	9400
9600	.18	.33	.46	.58	.71	.84	.96	1.08	1.21	1.33	1.45	1.58	9600
9800	.19	.33	.47	.60	.73	.85	.98	1.11	1.23	1.36	1.48	1.61	9800
	14°	15°	16°	18°	20°	22°	24°	26°	28°	30°	35°	40°	
100	.02	.02	.02	.02	.03	.03	.03	.03	.04	.04	.04	.05	100
200	.04	.04	.04	.05	.05	.06	.06	.07	.07	.08	.09	.10	200
300	.05	.06	.06	.07	.08	.08	.09	.10	.11	.12	.13	.15	300
400	.07	.08	.08	.09	.10	.11	.12	.13	.14	.15	.18	.21	400
500	.09	.09	.10	.11	.13	.14	.15	.17	.18	.19	.22	.26	500
600	.11	.11	.12	.14	.15	.17	.18	.20	.21	.23	.27	.31	600
700	.12	.13	.14	.16	.18	.20	.21	.23	.25	.27	.31	.36	700
800	.14	.15	.16	.18	.20	.22	.24	.27	.29	.31	.36	.41	800
900	.16	.17	.18	.21	.23	.25	.28	.30	.32	.35	.40	.46	900
1000	.18	.19	.20	.23	.25	.28	.31	.33	.36	.38	.45	.51	1000
1100	.19	.21	.22	.25	.28	.31	.34	.36	.39	.42	.49	.57	1100
1200	.21	.23	.24	.27	.30	.34	.37	.40	.43	.46	.54	.62	1200
1300	.23	.25	.26	.30	.33	.36	.40	.43	.46	.50	.58	.67	1300
1400	.25	.27	.28	.32	.36	.39	.43	.47	.50	.54	.63	.72	1400
1500	.27	.28	.30	.34	.38	.42	.46	.50	.54	.58	.67	.77	1500
1600	.28	.30	.32	.37	.41	.45	.49	.53	.57	.61	.72	.82	1600
1700	.30	.32	.34	.39	.43	.48	.52	.56	.61	.65	.76	.87	1700
1800	.32	.34	.37	.41	.46	.50	.55	.60	.64	.69	.81	.93	1800
1900	.34	.36	.39	.43	.48	.53	.58	.63	.68	.73	.85	.98	1900
2000	.35	.38	.41	.46	.51	.56	.61	.66	.71	.77	.90	1.03	2000
2100	.37	.40	.43	.48	.53	.59	.64	.70	.75	.81	.94	1.08	2100
2200	.39	.42	.45	.50	.56	.62	.67	.73	.79	.84	.99	1.13	2200
2300	.41	.44	.47	.53	.58	.64	.70	.76	.82	.88	1.03	1.18	2300
2400	.42	.46	.49	.55	.61	.67	.73	.80	.86	.92	1.08	1.24	2400
2500	.44	.47	.51	.57	.64	.70	.76	.83	.89	.96	1.12	1.29	2500
2600	.46	.49	.53	.59	.66	.73	.80	.86	.93	1.00	1.17	1.34	2600
2700	.48	.51	.55	.62	.69	.76	.83	.90	.97	1.04	1.21	1.39	2700
2800	.50	.53	.57	.64	.71	.78	.86	.93	1.00	1.07	1.26	1.44	2800
2900	.51	.55	.59	.66	.74	.81	.89	.96	1.04	1.11	1.30	1.49	2900

VALUE FOR A 1° CURVE	DEGREE OF CURVE												VALUE FOR A 1° CURVE
	14°	15°	16°	18°	20°	22°	24°	26°	28°	30°	35°	40°	
3000	.53	.57	.61	.69	.76	.84	.92	.99	1.07	1.15	1.35	1.54	3000
3100	.55	.59	.63	.71	.79	.87	.95	1.03	1.11	1.19	1.39	1.60	3100
3200	.57	.61	.65	.73	.81	.90	.98	1.06	1.14	1.23	1.44	1.65	3200
3300	.58	.63	.67	.75	.84	.92	1.01	1.09	1.18	1.27	1.48	1.70	3300
3400	.60	.65	.69	.78	.86	.95	1.04	1.13	1.22	1.30	1.53	1.75	3400
3500	.62	.66	.71	.80	.89	.98	1.07	1.16	1.25	1.34	1.57	1.80	3500
3600	.64	.68	.73	.82	.91	1.01	1.10	1.19	1.29	1.38	1.62	1.85	3600
3700	.65	.70	.75	.85	.94	1.04	1.13	1.23	1.32	1.42	1.66	1.90	3700
3800	.67	.72	.77	.87	.97	1.06	1.16	1.26	1.36	1.46	1.71	1.96	3800
3900	.69	.74	.79	.89	.99	1.09	1.19	1.29	1.39	1.50	1.75	2.01	3900
4000	.71	.76	.81	.91	1.02	1.12	1.22	1.33	1.43	1.53	1.80	2.06	4000
4100	.73	.78	.83	.94	1.04	1.15	1.25	1.36	1.47	1.57	1.84	2.11	4100
4200	.74	.80	.85	.96	1.07	1.18	1.28	1.39	1.50	1.61	1.89	2.16	4200
4300	.76	.82	.87	.98	1.09	1.20	1.31	1.43	1.54	1.65	1.93	2.21	4300
4400	.78	.84	.89	1.01	1.12	1.23	1.35	1.46	1.57	1.69	1.98	2.26	4400
4500	.80	.85	.91	1.03	1.14	1.26	1.38	1.49	1.61	1.73	2.02	2.32	4500
4600	.81	.87	.93	1.05	1.17	1.29	1.41	1.53	1.64	1.76	2.06	2.37	4600
4700	.83	.89	.95	1.07	1.19	1.32	1.44	1.56	1.68	1.80	2.11	2.42	4700
4800	.85	.91	.97	1.10	1.22	1.34	1.47	1.59	1.72	1.84	2.15	2.47	4800
4900	.87	.93	.99	1.12	1.25	1.37	1.50	1.62	1.75	1.88	2.20	2.52	4900
5000	.98	.95	1.01	1.14	1.27	1.40	1.53	1.66	1.79	1.92	2.24	2.57	5000
5100	.90	.97	1.03	1.17	1.30	1.43	1.56	1.69	1.82	1.96	2.29	2.62	5100
5200	.92	.99	1.05	1.19	1.32	1.46	1.59	1.72	1.86	1.99	2.33	2.68	5200
5300	.94	1.01	1.07	1.21	1.35	1.48	1.62	1.76	1.89	2.03	2.38	2.73	5300
5400	.96	1.03	1.10	1.23	1.37	1.51	1.65	1.79	1.93	2.07	2.42	2.78	5400
5500	.97	1.04	1.12	1.26	1.40	1.54	1.68	1.82	1.97	2.11	2.47	2.83	5500
5600	.99	1.06	1.14	1.28	1.42	1.57	1.71	1.86	2.00	2.15	2.51	2.88	5600
5700	1.01	1.08	1.16	1.30	1.45	1.60	1.74	1.89	2.04	2.19	2.56	2.93	5700
5800	1.03	1.10	1.18	1.33	1.47	1.62	1.77	1.92	2.07	2.22	2.60	2.99	5800
5900	1.04	1.12	1.20	1.35	1.50	1.65	1.80	1.96	2.11	2.26	2.65	3.04	5900
6000	1.06	1.14	1.22	1.37	1.52	1.68	1.83	1.99	2.14	2.30	2.69	3.09	6000
6100	1.08	1.16	1.24	1.39	1.55	1.71	1.87	2.02	2.18	2.34	2.74	3.14	6100
6200	1.10	1.18	1.26	1.42	1.58	1.74	1.90	2.06	2.22	2.38	2.78	3.19	6200
6300	1.11	1.20	1.28	1.44	1.60	1.76	1.93	2.09	2.25	2.42	2.83	3.24	6300
6400	1.13	1.22	1.30	1.46	1.63	1.79	1.96	2.12	2.29	2.45	2.87	3.29	6400
6500	1.15	1.23	1.32	1.48	1.65	1.82	1.99	2.16	2.32	2.49	2.92	3.35	6500
6600	1.17	1.25	1.34	1.51	1.68	1.85	2.02	2.19	2.36	2.53	2.96	3.40	6600
6700	1.19	1.27	1.36	1.53	1.70	1.88	2.05	2.22	2.39	2.57	3.01	3.45	6700
6800	1.20	1.29	1.38	1.55	1.73	1.90	2.08	2.25	2.43	2.61	3.05	3.50	6800
6900	1.22	1.31	1.40	1.58	1.75	1.93	2.11	2.29	2.47	2.65	3.10	3.55	6900
7000	1.24	1.33	1.42	1.60	1.78	1.96	2.14	2.32	2.50	2.68	3.14	3.60	7000
7100	1.26	1.35	1.44	1.62	1.80	1.99	2.17	2.35	2.54	2.72	3.19	3.65	7100
7200	1.27	1.37	1.46	1.64	1.83	2.02	2.20	2.39	2.57	2.76	3.23	3.71	7200
7300	1.29	1.39	1.48	1.67	1.86	2.04	2.23	2.42	2.61	2.80	3.28	3.76	7300
7400	1.31	1.41	1.50	1.69	1.88	2.07	2.26	2.45	2.65	2.84	3.32	3.81	7400
7500	1.33	1.42	1.52	1.71	1.91	2.10	2.29	2.49	2.68	2.88	3.37	3.86	7500
7600	1.34	1.44	1.54	1.74	1.93	2.13	2.32	2.52	2.72	2.91	3.41	3.91	7600
7700	1.36	1.46	1.56	1.76	1.96	2.16	2.35	2.55	2.75	2.95	3.46	3.96	7700
7800	1.38	1.48	1.58	1.78	1.98	2.18	2.39	2.59	2.79	2.99	3.50	4.01	7800
7900	1.40	1.50	1.60	1.80	2.01	2.21	2.42	2.62	2.82	3.03	3.55	4.07	7900
8000	1.42	1.52	1.62	1.83	2.03	2.24	2.45	2.65	2.86	3.07	3.59	4.12	8000
8200	1.45	1.56	1.66	1.87	2.08	2.30	2.51	2.72	2.93	3.14	3.68	4.22	8200
8400	1.49	1.60	1.70	1.92	2.13	2.35	2.57	2.79	3.00	3.22	3.77	4.32	8400
8600	1.52	1.63	1.74	1.96	2.19	2.41	2.63	2.85	3.07	3.30	3.86	4.43	8600
8800	1.56	1.67	1.78	2.01	2.24	2.46	2.69	2.92	3.15	3.37	3.95	4.53	8800
9000	1.59	1.71	1.83	2.06	2.29	2.52	2.75	2.98	3.22	3.45	4.04	4.63	9000
9200	1.63	1.75	1.87	2.10	2.34	2.58	2.81	3.05	3.29	3.53	4.13	4.74	9200
9400	1.66	1.78	1.91	2.15	2.39	2.63	2.87	3.12	3.36	3.60	4.22	4.84	9400
9600	1.70	1.82	1.95	2.19	2.44	2.69	2.94	3.18	3.43	3.68	4.31	4.94	9600
9800	1.73	1.86	1.99	2.24	2.49	2.74	3.00	3.25	3.50	3.76	4.40	5.04	9800

RADIUS	MULTIPLY 1°C. FUNCTIONS BY	DEGREE OF CURVE
5	.000873	
10	.001745	
15	.002618	
20	.003491	
25	.004363	
30	.005236	
35	.006109	
40	.006981	
45	.007854	
50	.008727	
55	.009599	
60	.010472	
65	.011344	
70	.012217	
75	.013090	
80	.013962	
85	.014835	
90	.015708	
95	.016580	
100	.017453	
105	.018326	
110	.019198	
115	.020071	
120	.020944	
125	.021816	
130	.022689	
135	.023562	
140	.024434	
145	.025307	
150	.026180	
155	.027052	37° 38.3'
160	.027925	36 - 25.2
165	.028797	35 - 16.8
170	.029670	34 - 12.6
175	.030543	33 - 12.2
180	.031415	32 - 15.3
185	.032288	31 - 21.6
190	.033161	30 - 30.9
195	.034033	29 - 42.9
200	.034906	28 - 57.3
205	.035779	28 - 14.0
210	.036651	27 - 32.9
215	.037524	26 - 53.7
220	.038397	26 - 16.4
225	.039269	25 - 40.8
230	.040142	25 - 06.7
235	.041015	24 - 34.1
240	.041887	24 - 03.0
245	.042760	23 - 33.1
250	.043633	23 - 04.4
255	.044505	22 - 36.9
260	.045378	22 - 10.5
265	.046250	21 - 45.1
270	.047123	21 - 20.6
275	.047996	20 - 57.1
280	.048868	20 - 34.4
285	.049741	20 - 12.5
290	.050614	19 - 51.4
295	.051486	19 - 31.0
300	.052359	19 - 11.3

RADIUS	MULTIPLY 1°C. FUNCTIONS BY	DEGREE OF CURVE
305	.053232	18° 52.2
310	.054104	18 - 33.8
315	.054977	18 - 16.0
320	.055850	17 - 58.7
325	.056722	17 - 42.0
330	.057595	17 - 25.8
335	.058468	17 - 10.0
340	.059340	16 - 54.8
345	.060213	16 - 40.0
350	.061086	16 - 25.6
355	.061958	16 - 11.6
360	.062831	15 - 58.0
365	.063703	15 - 44.8
370	.064576	15 - 32.0
375	.065449	15 - 19.5
380	.066321	15 - 07.3
385	.067194	14 - 55.4
390	.068067	14 - 43.9
395	.068939	14 - 32.7
400	.069812	14 - 21.7
405	.070685	14 - 11.0
410	.071557	14 - 00.6
415	.072430	13 - 50.4
420	.073303	13 - 40.5
425	.074175	13 - 30.8
430	.075048	13 - 21.3
435	.075921	13 - 12.0
440	.076793	13 - 03.0
445	.077666	12 - 54.2
450	.078539	12 - 45.6
455	.079411	12 - 37.1
460	.080284	12 - 28.8
465	.081156	12 - 20.7
470	.082029	12 - 12.8
475	.082902	12 - 05.1
480	.083774	11 - 57.5
485	.084647	11 - 50.1
490	.085520	11 - 42.8
495	.086392	11 - 35.7
500	.087265	11 - 28.7
505	.088138	11 - 21.9
510	.089010	11 - 15.2
515	.089883	11 - 08.6
520	.090756	11 - 02.1
525	.091628	10 - 55.8
530	.092501	10 - 49.6
535	.093374	10 - 43.5
540	.094246	10 - 37.5
545	.095119	10 - 31.7
550	.095992	10 - 25.9
555	.096864	10 - 20.3
560	.097737	10 - 14.7
565	.098609	10 - 09.2
570	.099482	10 - 03.9
575	.100355	9 - 58.6
580	.101227	9 - 53.5
585	.102100	9 - 48.4
590	.102973	9 - 43.4
595	.103845	9 - 38.5
600	.104718	9 - 33.6

	DEGREE OF CURVE									
′	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°
0	Infinite	5729.65	2864.93	1910.08	1432.69	1146.28	955.37	819.02	716.78	637.27
1	343774.7	5635.72	2841.26	1899.53	1426.74	1142.47	952.72	817.08	715.29	636.10
2	171887.3	5544.83	2817.97	1889.09	1420.85	1138.69	950.09	815.14	713.81	634.93
3	114591.6	5456.98	2795.06	1878.77	1415.01	1134.94	947.48	813.22	712.33	633.76
4	85943.7	5371.56	2772.53	1868.56	1409.21	1131.21	944.88	811.30	710.87	632.60
5	68754.9	5288.92	2750.35	1858.47	1403.46	1127.50	942.29	809.40	709.40	631.44
6	57295.8	5208.79	2728.52	1848.48	1397.76	1123.82	939.72	807.50	707.94	630.29
7	49110.7	5131.05	2707.04	1838.59	1392.10	1120.16	937.16	805.61	706.49	629.14
8	42971.8	5055.59	2685.89	1828.82	1386.49	1116.52	934.62	803.73	705.05	627.99
9	38197.2	4982.33	2665.08	1819.14	1380.92	1112.91	932.09	801.86	703.61	626.85
10	34377.5	4911.15	2644.58	1809.57	1375.40	1109.33	929.57	800.00	702.18	625.71
11	31252.3	4841.98	2624.39	1800.10	1369.92	1105.76	927.07	798.14	700.75	624.58
12	28647.9	4774.74	2604.51	1790.73	1364.49	1102.22	924.58	796.30	699.33	623.45
13	26444.2	4709.33	2584.93	1781.45	1359.10	1098.70	922.10	794.46	697.91	622.32
14	24555.4	4645.69	2565.65	1772.27	1353.75	1095.20	919.64	792.63	696.50	621.20
15	22918.3	4583.75	2546.64	1763.18	1348.45	1091.73	917.19	790.81	695.09	620.09
16	21485.9	4523.44	2527.92	1754.19	1343.18	1088.28	914.75	789.00	693.70	618.97
17	20222.1	4464.70	2509.47	1745.29	1337.96	1084.85	912.33	787.20	692.30	617.87
18	19098.6	4407.46	2491.29	1736.48	1332.77	1081.44	909.92	785.40	690.91	616.76
19	18093.4	4351.67	2473.37	1727.75	1327.63	1078.05	907.52	783.62	689.53	615.66
20	17188.8	4297.28	2455.70	1719.12	1322.53	1074.68	905.13	781.84	688.16	614.56
21	16370.2	4244.23	2438.29	1710.57	1317.46	1071.34	902.76	780.07	686.78	613.47
22	15626.1	4192.47	2421.12	1702.10	1312.43	1068.01	900.40	778.31	685.42	612.38
23	14946.8	4141.96	2404.19	1693.72	1307.45	1064.71	898.05	776.55	684.06	611.30
24	14324.0	4092.66	2387.50	1685.42	1302.50	1061.43	895.71	774.81	682.70	610.21
25	13751.0	4044.51	2371.04	1677.20	1297.58	1058.16	893.39	773.07	681.35	609.14
26	13222.1	3997.48	2354.80	1669.06	1292.71	1054.92	891.08	771.34	680.01	608.06
27	12732.4	3951.54	2338.78	1661.00	1287.87	1051.70	888.78	769.61	678.67	606.99
28	12277.7	3906.64	2322.98	1653.01	1283.07	1048.49	886.49	767.90	677.34	605.93
29	11854.3	3862.74	2307.39	1645.11	1278.30	1045.31	884.21	766.19	676.01	604.86
30	11459.2	3819.83	2292.01	1637.28	1273.57	1042.14	881.95	764.49	674.69	603.80
31	11089.5	3777.85	2276.84	1629.52	1268.87	1039.00	879.69	762.80	673.37	602.75
32	10743.0	3736.79	2261.86	1621.84	1264.21	1035.87	877.45	761.11	672.06	601.70
33	10417.5	3696.61	2247.08	1614.22	1259.58	1032.76	875.22	759.43	670.75	600.65
34	10111.1	3657.29	2232.49	1606.68	1254.98	1029.67	873.00	757.76	669.45	599.61
35	9822.18	3618.80	2218.09	1599.21	1250.42	1026.60	870.79	756.10	668.15	598.57
36	9549.34	3581.10	2203.87	1591.81	1245.89	1023.55	868.60	754.44	666.86	597.53
37	9291.25	3544.19	2189.84	1584.48	1241.40	1020.51	866.41	752.80	665.57	596.50
38	9046.75	3508.02	2175.98	1577.21	1236.94	1017.49	864.24	751.16	664.29	595.47
39	8814.78	3472.59	2162.30	1570.01	1232.51	1014.50	862.07	749.52	663.01	594.44
40	8594.42	3437.87	2148.79	1562.88	1228.11	1011.51	859.92	747.89	661.74	593.42
41	8384.80	3403.83	2135.44	1555.81	1223.74	1008.55	857.78	746.27	660.47	592.40
42	8185.16	3370.46	2122.26	1548.80	1219.40	1005.60	855.65	744.66	659.21	591.38
43	7994.81	3337.74	2109.24	1541.86	1215.09	1002.67	853.53	743.06	657.95	590.37
44	7813.11	3305.65	2096.39	1534.98	1210.82	999.76	851.42	741.46	656.69	589.36
45	7639.49	3274.17	2083.68	1528.16	1206.57	996.87	849.32	739.86	655.45	588.36
46	7473.42	3243.29	2071.13	1521.40	1202.36	993.99	847.23	738.28	654.20	587.36
47	7314.41	3212.98	2058.73	1514.70	1198.17	991.13	845.15	736.70	652.96	586.36
48	7162.03	3183.23	2046.48	1508.06	1194.01	988.28	843.08	735.13	651.73	585.36
49	7015.87	3154.03	2034.37	1501.48	1189.88	985.45	841.02	733.56	650.50	584.37
50	6875.55	3125.36	2022.41	1494.95	1185.78	982.64	838.97	732.01	649.27	583.38
51	6740.74	3097.20	2010.59	1488.48	1181.71	979.84	836.93	730.45	648.05	582.40
52	6611.12	3069.55	1998.90	1482.07	1177.66	977.06	834.90	728.91	646.84	581.42
53	6486.38	3042.39	1987.35	1475.71	1173.65	974.29	832.88	727.37	645.63	580.44
54	6366.26	3015.71	1975.93	1469.41	1169.66	971.54	830.88	725.84	644.42	579.47
55	6250.51	2989.48	1964.64	1463.16	1165.70	968.81	828.88	724.31	643.22	578.49
56	6138.90	2963.72	1953.48	1456.96	1161.76	966.09	826.89	722.79	642.02	577.53
57	6031.20	2938.39	1942.44	1450.81	1157.85	963.39	824.91	721.28	640.83	576.56
58	5927.22	2913.49	1931.53	1444.72	1153.97	960.70	822.93	719.77	639.64	575.60
59	5826.76	2889.01	1920.75	1438.68	1150.11	958.02	820.97	718.27	638.45	574.64

I	DEGREE OF CURVE									
	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°
0	573.69	521.67	478.34	441.68	410.28	383.06	359.26	338.27	319.62	302.94
2	571.78	520.10	477.02	440.56	409.31	382.22	358.52	337.62	319.04	302.42
4	569.90	518.54	475.71	439.44	408.34	381.38	357.78	336.96	318.45	301.89
6	568.02	516.99	474.40	438.33	407.38	380.54	357.05	336.31	317.87	301.37
8	566.16	515.44	473.10	437.22	406.42	379.71	356.32	335.66	317.29	300.85
10	564.31	513.91	471.81	436.12	405.47	378.88	355.59	335.01	316.71	300.33
12	562.47	512.38	470.53	435.02	404.53	378.05	354.86	334.37	316.14	299.82
14	560.64	510.87	469.25	433.93	403.58	377.23	354.13	333.73	315.57	299.30
16	558.82	509.36	467.98	432.84	402.65	376.41	353.41	333.09	315.00	298.79
18	557.02	507.86	466.72	431.76	401.71	375.60	352.70	332.45	314.43	298.28
20	555.23	506.38	465.46	430.69	400.78	374.79	351.98	331.82	313 86	297.77
22	553.45	504.90	464.21	429.62	399.86	373.98	351.27	331.18	313 29	297.26
24	551.68	503.42	462.97	428.56	398.94	373.17	350.56	330.55	312.73	296.75
26	549.92	501.96	461.73	427.50	398.02	372.37	349.85	329.93	312.17	296.25
28	548.17	500.51	460.50	426.44	397.11	371.57	349.15	329.30	311.61	295.75
30	546.44	499.06	459.28	425.40	396.20	370.78	348.45	328.68	311.06	295.25
32	544.71	497.62	458.06	424.35	395.30	369.99	347.75	328.06	310.50	294.75
34	543.00	496.19	456.85	423.32	394.40	369.20	347.06	327.44	309.95	294.25
36	541.30	494.77	455.65	422.28	393.50	368.42	346.37	326.83	309.40	293.76
38	539.61	493.36	454.45	421.26	392.61	367.64	345.68	326.21	308.85	293.26
40	537.92	491.96	453.26	420.23	391.72	366.86	344.99	325.60	308.30	292.77
42	536.25	490.56	452.07	419.22	390.84	366.09	344.31	325.00	307.76	292.28
44	534.59	489.17	450.89	418.20	389.96	365.31	343.62	324.39	307.22	291.79
46	532.94	487.79	449.72	417.19	389.08	364.55	342.95	323.79	306.68	291.30
48	531.30	486.42	448.56	416.19	388.21	363.78	342.27	323.18	306.14	290.82
50	529.67	485.05	447.40	415.19	387.34	363.02	341.60	322 59	305.60	290.33
52	528.05	483.69	446.24	414.20	386.48	362.26	340.93	321.99	305.06	289.85
54	526.44	482.34	445.09	413.21	385.62	361.51	340.26	321.39	304.53	289.37
56	524.84	481.00	443.95	412.23	384.77	360.76	339.60	320.80	304.00	288.89
58	523.25	479.67	442.81	411.25	383.91	360.01	338.93	320.21	303.47	288.41

DEGREE OF CURVE	MINUTES						DEGREE OF CURVE
	0′	10′	20′	30′	40′	50′	
20°	287.94	285.58	283.27	280.99	278.75	276.54	20°
21	274.37	272.23	270.13	268.06	266.02	264.02	21
22	262.04	260.10	258.18	256.29	254.43	252.60	22
23	250.79	249.01	247.26	245.53	243.82	242.14	23
24	240.49	238.85	237.24	235.65	234.08	232.54	24
25	231.01	229.51	228.02	226.55	225.11	223.68	25
26	222.27	220.88	219.51	218.15	216.81	215.49	26
27	214.18	212.89	211.62	210.36	209.12	207.89	27
28	206.68	205.48	204.30	203.13	201.97	200.83	28
29	199.70	198.58	197.48	196.38	195.31	194.24	29
30	193.19	192.14	191.11	190.09	189.08	188.09	30
31	187.10	186.12	185.16	184.20	183.26	182.32	31
32	181.40	180.48	179.58	178.68	177.79	176.92	32
33	176.05	175.19	174.34	173.49	172.66	171.83	33
34	171.02	170.21	169.40	168.61	167.82	167.05	34
35	166.28	165.51	164.76	164.01	163.27	162.53	35
36	161.80	161.08	160.37	159.66	158.96	158.27	36
37	157.58	156.90	156.22	155.55	154.89	154.23	37
38	153.58	152.93	152.29	151.66	151.03	150.41	38
39	149.79	149.17	148.57	147.97	147.37	146.78	39
40	146.19	145.61	145.03	144.46	143.89	143.33	40
41	142.77	142.22	141.67	141.13	140.59	140.05	41
42	139.52	138.99	138.47	137.95	137.44	136.93	42
43	136.43	135.92	135.43	134.93	134.44	133.96	43
44	133.47	132.99	132.52	132.05	131.58	131.12	44
45	130.66	130.20	129.75	129.30	128.85	128.41	45
46	127.97	127.53	127.09	126.66	126.24	125.81	46
47	125.39	124.97	124.56	124.15	123.74	123.33	47
48	122.93	122.53	122.13	121.74	121.35	120.96	48
49	120.57	120.19	119.81	119.43	119.05	118.68	49

SINES

DEGREES	MINUTES 0′	10′	20′	30′	40′	50′	60′	
0°	.0000000	.0029089	.0058177	.0087265	.0116353	.0145439	.0174524	89°
1	.0174524	.0203608	.0232690	.0261769	.0290847	.0319922	.0348995	88
2	.0348995	.0378065	.0407131	.0436194	.0465253	.0494308	.0523360	87
3	.0523360	.0552406	.0581448	.0610485	.0639517	.0668544	.0697565	86
4	.0697565	.0726580	.0755589	.0784591	.0813587	.0842576	.0871557	85
5	.0871557	.0900532	.0929499	.0958458	.0987408	.1016351	.1045285	84
6	.1045285	.1074210	.1103126	.1132032	.1160929	.1189816	.1218693	83
7	.1218693	.1247560	.1276416	.1305262	.1334096	.1362919	.1391731	82
8	.1391731	.1420531	.1449319	.1478094	.1506857	.1535607	.1564345	81
9	.1564345	.1593069	.1621779	.1650476	.1679159	.1707828	.1736482	80
10	.1736482	.1765121	.1793746	.1822355	.1850949	.1879528	.1908090	79
11	.1908090	.1936636	.1965166	.1993679	.2022176	.2050655	.2079117	78
12	.2079117	.2107561	.2135988	.2164396	.2192786	.2221158	.2249511	77
13	.2249511	.2277844	.2306159	.2334454	.2362729	.2390984	.2419219	76
14	.2419219	.2447433	.2475627	.2503800	.2531952	.2560082	.2588190	75
15	.2588190	.2616277	.2644342	.2672384	.2700403	.2728400	.2756374	74
16	.2756374	.2784324	.2812251	.2840153	.2868032	.2895887	.2923717	73
17	.2923717	.2951522	.2979303	.3007058	.3034788	.3062492	.3090170	72
18	.3090170	.3117822	.3145448	.3173047	.3200619	.3228164	.3255682	71
19	.3255682	.3283172	.3310634	.3338069	.3365475	.3392852	.3420201	70
20	.3420201	.3447521	.3474812	.3502074	.3529306	.3556508	.3583679	69
21	.3583679	.3610821	.3637932	.3665012	.3692061	.3719079	.3746066	68
22	.3746066	.3773021	.3799944	.3826834	.3853693	.3880518	.3907311	67
23	.3907311	.3934071	.3960798	.3987491	.4014150	.4040775	.4067366	66
24	.4067366	.4093923	.4120445	.4146932	.4173385	.4199801	.4226183	65
25	.4226183	.4252528	.4278838	.4305111	.4331348	.4357548	.4383711	64
26	.4383711	.4409838	.4435927	.4461978	.4487992	.4513967	.4539905	63
27	.4539905	.4565804	.4591665	.4617486	.4643269	.4669012	.4694716	62
28	.4694716	.4720380	.4746004	.4771588	.4797131	.4822634	.4848096	61
29	.4848096	.4873517	.4898897	.4924236	.4949532	.4974787	.5000000	60
30	.5000000	.5025170	.5050298	.5075384	.5100426	.5125425	.5150381	59
31	.5150381	.5175293	.5200161	.5224986	.5249766	.5274502	.5299193	58
32	.5299193	.5323839	.5348440	.5372996	.5397507	.5421971	.5446390	57
33	.5446390	.5470763	.5495090	.5519370	.5543603	.5567790	.5591929	56
34	.5591929	.5616021	.5640066	.5664062	.5688011	.5711912	.5735764	55
35	.5735764	.5759568	.5783323	.5807030	.5830687	.5854294	.5877853	54
36	.5877853	.5901361	.5924819	.5948228	.5971586	.5994893	.6018150	53
37	.6018150	.6041356	.6064511	.6087614	.6110666	.6133666	.6156615	52
38	.6156615	.6179511	.6202355	.6225146	.6247885	.6270571	.6293204	51
39	.6293204	.6315784	.6338310	.6360782	.6383201	.6405566	.6427876	50
40	.6427876	.6450132	.6472334	.6494480	.6516572	.6538609	.6560590	49
41	.6560590	.6582516	.6604386	.6626200	.6647959	.6669661	.6691306	48
42	.6691306	.6712895	.6734427	.6755902	.6777320	.6798681	.6819984	47
43	.6819984	.6841229	.6862416	.6883546	.6904617	.6925630	.6946584	46
44	.6946584	.6967479	.6988315	.7009093	.7029811	.7050469	.7071068	45
	60′	50′	40′	30′	20′	10′	0′	DEGREES
	MINUTES							

COSINES

SINES

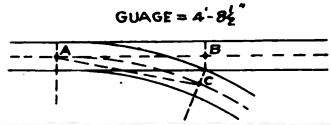
DEGREES	MINUTES 0′	10′	20′	30′	40′	50′	60′	
45°	.7071068	.7091607	.7112086	.7132504	.7152863	.7173161	.7193398	44°
46	.7193398	.7213574	.7233690	.7253744	.7273736	.7293668	.7313537	43
47	.7313537	.7333345	.7353090	.7372773	.7392394	.7411953	.7431448	42
48	.7431448	.7450881	.7470251	.7489557	.7508800	.7527980	.7547096	41
49	.7547096	.7566148	.7585136	.7604060	.7622919	.7641714	.7660444	40
50	.7660444	.7679110	.7697710	.7716246	.7734716	.7753121	.7771460	39
51	.7771460	.7789733	.7807940	.7826082	.7844157	.7862165	.7880108	38
52	.7880108	.7897983	.7915792	.7933533	.795 1208	.7968815	.7986355	37
53	.7986355	.8003827	.8021232	.8038569	.8055837	.8073038	.8090170	36
54	.8090170	.8107234	.8124229	.8141155	.8158013	.8174801	.8191520	35
55	.8191520	.8208170	.8224751	.8241262	.8257703	.8274074	.8290376	34
56	.8290376	.8306607	.8322768	.8338858	.8354878	.8370827	.8386706	33
57	.8386706	.8402513	.8418249	.8433914	.8449508	.8465030	.8480481	32
58	.8480481	.8495860	.8511167	.8526402	.8541564	.8556655	.8571673	31
59	.8571673	.8586619	.8601491	.8616292	.8631019	.8645673	.8660254	30
60	.8660254	.8674762	.8689196	.8703557	.8717844	.8732058	.8746197	29
61	.8746197	.8760263	.8774254	.8788171	.8802014	.8815782	.8829476	28
62	.8829476	.8843095	.8856639	.8870108	.8883503	.8896822	.8910065	27
63	.8910065	.8923234	.8936326	.8949344	.8962285	.8975151	.8987940	26
64	.8987940	.9000654	.9013292	.9025853	.9038338	.9050746	.9063078	25
65	.9063078	.9075333	.9087511	.9099613	.9111637	.9123584	.9135455	24
66	.9135455	.9147247	.9158963	.9170601	.9182161	.9193644	.9205049	23
67	.9205049	.9216375	.9227624	.9238795	.9249888	.9260902	.9271839	22
68	.9271839	.9282696	.9293475	.9304176	.9314797	.9325340	.9335804	21
69	.9335804	.9346189	.9356495	.9366722	.9376869	.9386938	.9396926	20
70	.9396926	.9406835	.9416665	.9426415	.9436085	.9445675	.9455186	19
71	.9455186	.9464616	.9473966	.9483237	.9492426	.9501536	.9510565	18
72	.9510565	.9519514	.9528382	.9537170	.9545876	.9554502	.9563048	17
73	.9563048	.9571512	.9579895	.9588197	.9596418	.9604558	.9612617	16
74	.9612617	.9620594	.9628490	.9636305	.9644037	.9651689	.9659258	15
75	.9659258	.9666746	.9674152	.9681476	.9688719	.9695879	.9702957	14
76	.9702957	.9709953	.9716867	.9723699	.9730449	.9737116	.9743701	13
77	.9743701	.9750203	.9756623	.9762960	.9769215	.9775387	.9781476	12
78	.9781476	.9787483	.9793406	.9799247	.9805005	.9810680	.9816272	11
79	.9816272	.9821781	.9827206	.9832549	.9837808	.9842985	.9848078	10
80	.9848078	.9853087	.9858013	.9862856	.9867615	.9872291	.9876883	9
81	.9876883	.9881392	.9885817	.9890159	.9894416	.9898590	.9902681	8
82	.9902681	.9906687	.9910610	.9914449	.9918204	.9921874	.9925462	7
83	.9925462	.9928965	.9932384	.9935719	.9938969	.9942136	.9945219	6
84	.9945219	.9948217	.9951132	.9953962	.9956708	.9959370	.9961947	5
85	.9961947	.9964440	.9966849	.9969173	.9971413	.9973569	.9975641	4
86	.9975641	.9977627	.9979530	.9981348	.9983082	.9984731	.9986295	3
87	.9986295	.9987775	.9989171	.9990482	.9991709	.9992851	.9993908	2
88	.9993908	.9994881	.9995770	.9996573	.9997292	.9997927	.9998477	1
89	.9998477	.9998942	.9999323	.9999619	.9999831	.9999958	1.000000	0
	60′	50′	40′	30′	20′	10′	0′	DEGREES
	MINUTES							

COSINES

TANGENTS

DEGREES	MINUTES 0′	10′	20′	30′	40′	50′	60′	
0°	.0000000	.0029089	.0058178	.0087269	.0116361	.0145454	.0174551	89°
1	.0174551	.0203650	.0232753	.0261859	.0290970	.0320086	.0349208	88
2	.0349208	.0378335	.0407469	.0436609	.0465757	.0494913	.0524078	87
3	.0524078	.0553251	.0582434	.0611626	.0640829	.0670043	.0699268	86
4	.0699268	.0728505	.0757755	.0787017	.0816293	.0845583	.0874887	85
5	.0874887	.0904206	.0933540	.0962890	.0992257	.1021641	.1051042	84
6	.1051042	.1080462	.1109899	.1139356	.1168832	.1198329	.1227846	83
7	.1227846	.1257384	.1286943	.1316525	.1346129	.1375757	.1405408	82
8	.1405408	.1435084	.1464784	.1494510	.1524262	.1554040	.1583844	81
9	.1583844	.1613677	.1643537	.1673426	.1703344	.1733292	.1763270	80
10	.1763270	.1793279	.1823319	.1853390	.1883495	.1913632	.1943803	79
11	.1943803	.1974008	.2004248	.2034523	.2064834	.2095181	.2125566	78
12	.2125566	.2155988	.2186448	.2216947	.2247485	.2278063	.2308682	77
13	.2308682	.2339342	.2370044	.2400788	.2431575	.2462405	.2493280	76
14	.2493280	.2524200	.2555165	.2586176	.2617234	.2648339	.2679492	75
15	.2679492	.2710694	.2741945	.2773245	.2804597	.2835999	.2867454	74
16	.2867454	.2898961	.2930521	.2962135	.2993803	.3025527	.3057307	73
17	.3057307	.3089143	.3121036	.3152988	.3184998	.3217067	.3249197	72
18	.3249197	.3281387	.3313639	.3345953	.3378330	.3410771	.3443276	71
19	.3443276	.3475846	.3508483	.3541186	.3573956	.3606795	.3639702	70
20	.3639702	.3672680	.3705728	.3738847	.3772038	.3805302	.3838640	69
21	.3838640	.3872053	.3905541	.3939105	.3972746	.4006465	.4040262	68
22	.4040262	.4074139	.4108097	.4142136	.4176257	.4210460	.4244748	67
23	.4244748	.4279121	.4313579	.4348124	.4382756	.4417477	.4452287	66
24	.4452287	.4487187	.4522179	.4557263	.4592439	.4627710	.4663077	65
25	.4663077	.4698539	.4734098	.4769755	.4805512	.4841368	.4877326	64
26	.4877326	.4913386	.4949549	.4985816	.5022189	.5058668	.5095254	63
27	.5095254	.5131950	.5168755	.5205671	.5242698	.5279839	.5317094	62
28	.5317094	.5354465	.5391952	.5429557	.5467281	.5505125	.5543091	61
29	.5543091	.5581179	.5619391	.5657728	.5696191	.5734783	.5773503	60
30	.5773503	.5812353	.5851335	.5890450	.5929699	.5969084	.6008606	59
31	.6008606	.6048266	.6088067	.6128008	.6168092	.6208320	.6248694	58
32	.6248694	.6289214	.6329883	.6370703	.6411673	.6452797	.6494076	57
33	.6494076	.6535511	.6577103	.6618856	.6660769	.6702845	.6745085	56
34	.6745085	.6787492	.6830066	.6872810	.6915725	.6958813	.7002075	55
35	.7002075	.7045515	.7089133	.7132931	.7176911	.7221075	.7265425	54
36	.7265425	.7309963	.7354691	.7399611	.7444724	.7490033	.7535541	53
37	.7535541	.7581248	.7627157	.7673270	.7719589	.7766118	.7812856	52
38	.7812856	.7859808	.7906975	.7954359	.8001963	.8049790	.8097840	51
39	.8097840	.8146118	.8194625	.8243364	.8292337	.8341547	.8390996	50
40	.8390996	.8440688	.8490624	.8540807	.8591240	.8641926	.8692867	49
41	.8692867	.8744067	.8795528	.8847253	.8899244	.8951506	.9004040	48
42	.9004040	.9056851	.9109940	.9163312	.9216969	.9270914	.9325151	47
43	.9325151	.9379683	.9434513	.9489646	.9545083	.9600829	.9656888	46
44	.9656888	.9713262	.9769956	.9826973	.9884316	.9941991	1.000000	45
′	60′	50′	40′	30′	20′	10′	0′	DEGREES
	MINUTES							

COTANGENTS



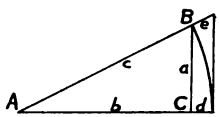
FROG NO.	FROG ANGLE	TURNOUT CURVE RADIUS	CURVE DEGREE	Theoretical Lead AB	CHORD AC	FROG NO.
4	14°-15'	150.67	38°-46'	37.67	37.38	4
4½	12-41	190.69	30-24	42.37	42.12	4½
5	11-25	235.42	24-31	47.08	46.85	5
5½	10-23	284.85	20-13	51.79	51.58	5½
6	9-32	339.00	16-58	56.50	56.31	6
6½	8-48	397.85	14-26	61.21	61.03	6½
7	8-10	461.42	12-27	65.92	65.75	7
7½	7-38	529.69	10-50	70.62	70.47	7½
8	7-09	602.67	9-31	75.33	75.19	8
8½	6-44	680.35	8-26	80.04	79.90	8½
9	6-22	762.75	7-31	84.75	84.62	9
9½	6-02	849.85	6-45	89.46	89.34	9½
10	5-43	941.66	6-05	94.17	94.05	10
11	5-12	1139.4	5-02	103.58	103.47	11
12	4-46	1356.0	4-14	113.00	112.90	12
13	4-24	1591.4	3-36	122.42	122.33	13
14	4-05	1845.6	3-06	131.83	131.75	14

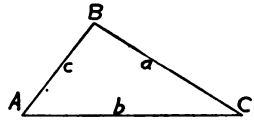
TABLE IX.- A.S.C.E. STANDARD RAIL SECTIONS.

WEIGHT LBS. PER YARD	WIDTH OF HEAD INCHES	WIDTH OF BASE INCHES	WEIGHT LBS. PER YARD	WIDTH OF HEAD INCHES	WIDTH OF BASE INCHES	WEIGHT LBS. PER YARD	WIDTH OF HEAD INCHES	WIDTH OF BASE INCHES
40	1⅞	3½	65	2 11/32	4 7/16	90	2⅝	5⅜
45	2	3 5/16	70	2 7/16	4 9/16	95	2 11/16	5 7/16
50	2⅛	3⅜	75	2 15/32	4 11/16	100	2¾	5 1/16
55	2¼	4 1/16	80	2½	5	Height of rail same as width of base		
60	2⅜	4¼	85	2 9/16	5 1/16			

TABLE X.- INCHES IN DECIMALS OF A FOOT.

INCHES	0	1	2	3	4	5	6	7	8	9	10	11	INCHES
0	FEET	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	0
1/16	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	1/16
1/8	.0104	.0937	.1771	.2604	.3437	.4271	.5104	.5937	.6771	.7604	.8437	.9271	1/8
3/16	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	3/16
1/4	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	1/4
5/16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	5/16
3/8	.0312	.1146	.1979	.2812	.3646	.4479	.5312	.6146	.6979	.7812	.8646	.9479	3/8
7/16	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	7/16
1/2	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1/2
9/16	.0469	.1302	.2135	.2969	.3802	.4635	.5469	.6302	.7135	.7969	.8802	.9635	9/16
5/8	.0521	.1354	.2187	.3021	.3854	.4687	.5521	.6354	.7187	.8021	.8854	.9687	5/8
11/16	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	11/16
3/4	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	3/4
13/16	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	13/16
7/8	.0729	.1562	.2396	.3229	.4062	.4896	.5729	.6562	.7396	.8229	.9062	.9896	7/8
15/16	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	15/16





SOLUTION OF RIGHT TRIANGLES.

1. $\sin A = \frac{a}{c} = \cos B$ 2. $\cos A = \frac{b}{c} = \sin B$ 3. $\tan A = \frac{a}{b} = \cot B$

4. $\cot A = \frac{b}{a} = \tan B$ 5. $\sec A = \frac{c}{b} = \operatorname{cosec} B$ 6. $\operatorname{cosec} A = \frac{c}{a} = \sec B$

7. $\operatorname{vers} A = \frac{d}{c} = \frac{c-b}{c}$ 8. $\operatorname{exsec} A = \frac{e}{c}$

SOLUTION OF OBLIQUE TRIANGLES.

9. $\frac{\sin A}{\sin B} = \frac{a}{b}$ 10. $\frac{\sin A}{\sin C} = \frac{a}{c}$ 11. $\frac{\sin B}{\sin C} = \frac{b}{c}$

12. $A+B+C = 180^\circ$ 13. $\frac{1}{2}(A+B) = 90^\circ - \frac{1}{2}C$

14. $\tan\frac{1}{2}(A-B) = \frac{a-b}{a+b}\tan\frac{1}{2}(A+B)$

15. $A = \frac{1}{2}(A+B) + \frac{1}{2}(A-B)$ 16. $B = \frac{1}{2}(A+B) - \frac{1}{2}(A-B)$

17. $\text{area} = \frac{1}{2}bc\sin A$ Let $s = \frac{1}{2}(a+b+c)$

18. $\sin\frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}$ 19. $\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$

GENERAL FORMULAS.

20. $\sin^2 A + \cos^2 A = 1$ 21. $\frac{\sin A}{\cos A} = \tan A$

22. $\operatorname{vers} A = 1 - \cos A$ 23. $\operatorname{exsec} A = \sec A - 1 = \frac{\operatorname{vers} A}{\cos A}$

1. Extra Width of Guage on Curves.

The guage should be widened $\frac{1}{24}$" for each degree of curve.

2. Elevation of outer Rail on Curves.

For a speed of 55 miles per hour the elevation = 2" x (degree of curve). The elevation varies as the square of the speed. Thus for a 4° curve and a speed of 40 miles per hour elevation $= 2 \times 4 \times \left(\frac{40}{55}\right)^2 = 4\frac{1}{4}$".

3. Middle Ordinates for curving Rails.

For a 30' rail the ordinate = .02' x (degree of curve). The ordinate varies as the square of the length of rail. Thus for an 8° curve and a 26' rail ordinate $= .02 \times 8 \times \left(\frac{26}{30}\right)^2 = .12'$

4. Rule for Keeping Joints square on a Curve.

Cut a rail of any length at a point distant from center of rail $\left(\frac{1}{2} \times \frac{L}{100} \times D\right)$ inches. In this formula L = length of curve in feet and D = degree of curve. Use the longer piece on the outer rail and the shorter piece on the inner rail.

5. Expansion of a Steel Rail.

Steel expands .01' per 100' for each 15° F. rise in temperature. Thus if the temperature changes from 0° to 90° a 30' rail will expand $\left(.01 \times \frac{30}{100} \times \frac{90}{15}\right) = .018'$

6. To determine the Degree of Curve of a Track without a Transit.

First Method. On standard guage track the degree of curve $= \left(\frac{466}{C}\right)^2$, in which C = long chord of outer guage line tangent to inner guage line, the middle ordinate being the guage of the track.

Second Method. If the long chord of outer guage line = 62' the middle ordinate in inches = degree of curve.

7. Compensation for Curvature.

To make resistance on a curve equal to resistance on a tangent decrease the grade on the curve .05% x(degree of curve).

8. Tons of Rail per Mile of Track.

The number of tons of 2240 lbs. in a mile of track $= \frac{11}{7} \times$ (weight per yard). Thus for a 56 lbs. rail tons per mile $= \frac{11}{7} \times 56 = 88$.

9. Formula giving the Radius of a Reversed Curve between Parallel Tangents.

Let p = perpendicular distance between tangents,
and d = length of chord from P.C. to P.T.

Then Radius $= \frac{d^2}{4p}$. (exact formula)

10. Approximate Values of E, C and M for a curve of Radius R and Degree D. (see table II)

If Δ is less than 20°,

I. $E = \frac{1}{4} \times \frac{7}{8} \times \frac{\Delta^2}{D}$ (approx.)

II. $M = \frac{1}{4} \times \frac{7}{8} \times \frac{\Delta^2}{D}$ (approx.)

III. $M = \frac{C^2}{8R}$ (approx.)

IV. $C = \sqrt{8RM}$ (approx.)

As Δ increases beyond 20° the error in using these formulas increases more rapidly, formulas I and III giving values too small and formulas II and IV giving values too large.

11. Correction for Curvature in chaining Track.

The correction for a 100' station = .04' x (degree of curve). Each station should be shortened by this amount when chaining on inner rail and lengthened by the same amount when chaining on outer rail.

12. Correction for Grade in chaining Track.

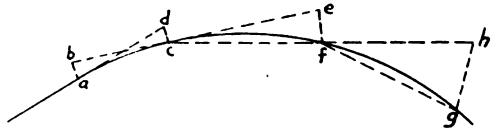
In chaining on a grade each 100' station should be lengthened by an amount equal to the square of the grade divided by 200. Thus on a 3% grade the correction per station is $\frac{3^2}{200}$ =.045' and the correction per mile 52.8 x.045 = 2.376'.

In its general form this formula becomes $K=\frac{h^2}{2b}$, in which b = the base of a right triangle and h the altitude, h being small in comparison with b. K = the amount the hypothenuse is longer than the base. Thus in laying off a right-angled distance of 66' suppose an obstacle is encountered but a point may be set 2.3' off of the right-angled line. The distance on the hypothenuse will be $66+\frac{(2.3)^2}{2\times66}$ = 66.04'

13. Method of locating a Curve by Offsets without a Transit.

Approximate offset from tangent $=\frac{7}{8}\left(\frac{L}{100}\right)^2 D$, in which L = length of curve and D = degree of curve.

Given a 2°-30' curve. Station of P.C. = 176+32. Required to set points at each station on the curve.



Point a = P.C. of curve.

Extend the tangent from a to d making ad = 68'.

$cd=\frac{7}{8}\left(\frac{68}{100}\right)^2\times2.5$ = 1.01' Measuring 68' from a and 1.01' from d locates station 177 at c.

Locate point b by measuring 68' from c and 1.01' from a. bc is tangent to the curve at c.

Extend bc to e making ce = 100'. $ef=\frac{7}{8}\left(\frac{100}{100}\right)^2\times2.5$ = 2.09'

Measuring 100' from c and 2.09' from e locates station 178 at f.

Extend chord cf to h making fh = 100'. 2x2.09 = 4.18' = hg.

Measuring 100' from f and 4.18' from h locates station 179 at g.

Locate the remaining stations same as station 179. If the 1st. station is near the P.C. set the 2nd station from original tangent.

Let A = any angle expressed in degrees and decimals of a degree.
tan = natural tangent of A.
R = radius of a curve whose degree = D.
A may be expressed in terms of tan by the following formulas:

(1) $A = 57.3\left(\tan - \frac{\tan^3}{3}\right)$ for values of tan from 0 to .25

(2) $A = \left[60 - \frac{100}{6}(\tan - .1)\right]\tan - .6 + \tan$ for values of tan from .25 to .50

(3) $A = \left[60 - \frac{100}{6}(\tan - .1)\right]\tan - \frac{10}{6}(.75 - \tan)^2$ for values of tan from .50 to .75

(4) $A = \left[60 - \frac{100}{6}(\tan - .1)\right]\tan - .01$ for values of tan from .75 to 1.00

For approximate results the above formulas may be simplified as follows:

(5) $A = 57.3 \tan$ for values of tan from 0 to .25

(6) $A = \left[60 - \frac{100}{6}(\tan - .1)\right]\tan$ for values of tan from .25 to 1.00

R may be expressed in terms of D as follows:

(7) $R = \frac{5729.58}{D} + .073D$

ERROR IN USING FORMULAS 5 AND 6.

Tangent	Angle by Form. 5	Angle by Form. 6	Exact Angle	Error in Minutes	Tangent	Angle by Form. 6	Exact Angle	Error in Minutes
0.05	2°-51.9'		2°-51.8'	+0.1	0.5	26°-40'	26°-33.9'	+6.1
0.1	5-43.1		5-42.6	+1.2	0.6	31-0	30-57.8	+2.2
0.2	11-27.6		11-19.6	+9.0	0.7	35-0	34-59.5	+0.5
0.25	14-19.5	14°-22.5'	14-02.2	+20.3	0.8	38-40	38-39.6	+0.4
0.3		17-0	16-42.0	+18.0	0.9	42-0	41-59.2	+0.8
0.4		22-0	21-48.1	+11.9	1.0	45-0	45-0	0.0

ERROR IN USING FORMULA 7.

D	Radius by Form. 7	Exact Radius	Error	D	Radius by Form. 7	Exact Radius	Error
0°-15'	22918.34	22918.33	+.01	11°	521.67	521.67	0
0-30	11459.20	11459.19	+.01	12	478.34	478.34	0
0-45	7639.49	7639.49	0	13	441.69	441.68	+.01
1-0	5729.65	5729.65	0	14	410.28	410.28	0
1-30	3819.83	3819.83	0	15	383.07	383.06	+.01
2	2864.94	2864.93	+.01	16	359.27	359.26	+.01
3	1910.08	1910.08	0	17	338.28	338.27	+.01
4	1432.69	1432.69	0	18	319.62	319.62	0
5	1146.28	1146.28	0	19	302.94	302.94	0
6	955.37	955.37	0	20	287.94	287.94	0
7	819.02	819.02	0	25	231.01	231.01	0
8	716.78	716.78	0	30	193.18	193.19	-.01
9	637.29	637.27	+.01	35	166.26	166.28	-.02
10	573.69	573.69	0	40	146.16	146.19	-.03

ERROR IN USING FORMULAS 1, 2, 3 AND 4.

Tangent	Angle by Formula 1	Exact Angle	Error in Minutes	Tangent	Angle by Formula 2	Exact Angle	Error in Minutes
.005	0°-17.2'	0°-17.2'	0.0	.25	14°-01.5'	14°-02.2'	-0.7
.01	0-34.4	0-34.4	0.0	.26	14-34.0	14-34.5	-0.5
.02	1-08.8	1-08.8	0.0	.27	15-06.3	15-06.6	-0.3
.03	1-43.1	1-43.1	0.0	.28	15-38.4	15-38.5	-0.1
.04	2-17.4	2-17.4	0.0	.29	16-10.3	16-10.3	0.0
.05	2-51.8	2-51.8	0.0	.30	16-42.0	16-42.0	0.0
.06	3-26.0	3-26.0	0.0	.31	17-13.5	17-13.4	+0.1
.07	4-00.3	4-00.2	+0.1	.32	17-44.8	17-44.7	+0.1
.08	4-34.5	4-34.4	+0.1	.33	18-15.9	18-15.8	+0.1
.09	5-08.6	5-08.6	0.0	.34	18-46.8	18-46.7	+0.1
.10	5-42.7	5-42.6	+0.1	.35	19-17.5	19-17.4	+0.1
.11	6-16.7	6-16.6	+0.1	.36	19-48.0	19-47.9	+0.1
.12	6-50.6	6-50.6	0.0	.37	20-18.3	20-18.3	0.0
.13	7-24.4	7-24.4	0.0	.38	20-48.4	20-48.4	0.0
.14	7-58.2	7-58.2	0.0	.39	21-18.3	21-18.3	0.0
.15	8-31.8	8-31.8	0.0	.40	21-48.0	21-48.1	-0.1
.16	9-05.4	9-05.4	0.0	.41	22-17.5	22-17.6	-0.1
.17	9-38.8	9-38.9	-0.1	.42	22-46.8	22-46.9	-0.1
.18	10-12.2	10-12.2	0.0	.43	23-15.9	23-16.1	-0.2
.19	10-45.4	10-45.5	-0.1	.44	23-44.8	23-45.0	-0.2
.20	11-18.4	11-18.6	-0.2	.45	24-13.5	24-13.7	-0.2
.21	11-51.4	11-51.6	-0.2	.46	24-42.0	24-42.1	-0.1
.22	12-24.2	12-24.5	-0.3	.47	25-10.3	25-10.4	-0.1
.23	12-56.8	12-57.2	-0.4	.48	25-38.4	25-38.5	-0.1
.24	13-29.3	13-29.7	-0.4	.49	26-06.3	26-06.3	0.0
.25	14-01.6	14-02.2	-0.6	.50	26-34.0	26-33.9	+0.1

Tangent	Angle by Formula 3	Exact Angle	Error in Minutes	Tangent	Angle by Formula 4	Exact Angle	Error in Minutes
.50	26°-33.8'	26°-33.9'	-0.1	.75	36°-51.9'	36°-52.2'	-0.3
.51	27-01.1	27-01.3	-0.2	.76	37-13.8	37-14.1	-0.3
.52	27-28.3	27-28.5	-0.2	.77	37-35.5	37-35.8	-0.3
.53	27-55.3	27-55.4	-0.1	.78	37-57.0	37-57.3	-0.3
.54	28-22.0	28-22.1	-0.1	.79	38-18.3	38-18.5	-0.2
.55	28-48.5	28-48.6	-0.1	.80	38-39.4	38-39.6	-0.2
.56	29-14.8	29-14.9	-0.1	.81	39-00.3	39-00.4	-0.1
.57	29-40.9	29-41.0	-0.1	.82	39-21.0	39-21.1	-0.1
.58	30-06.7	30-06.8	-0.1	.83	39-41.5	39-41.6	-0.1
.59	30-32.3	30-32.4	-0.1	.84	40-01.8	40-01.8	0.0
.60	30-57.8	30-57.8	0.0	.85	40-21.9	40-21.9	0.0
.61	31-22.9	31-23.0	-0.1	.86	40-41.8	40-41.7	+0.1
.62	31-47.9	31-47.9	0.0	.87	41-01.5	41-01.4	+0.1
.63	32-12.7	32-12.7	0.0	.88	41-21.0	41-20.9	+0.1
.64	32-37.2	32-37.2	0.0	.89	41-40.3	41-40.1	+0.2
.65	33-01.5	33-01.4	+0.1	.90	41-59.4	41-59.2	+0.2
.66	33-25.6	33-25.5	+0.1	.91	42-18.3	42-18.1	+0.2
.67	33-49.5	33-49.3	+0.2	.92	42-37.0	42-36.8	+0.2
.68	34-13.1	34-13.0	+0.1	.93	42-55.5	42-55.4	+0.1
.69	34-36.5	34-36.3	+0.2	.94	43-13.8	43-13.7	+0.1
.70	34-59.7	34-59.5	+0.2	.95	43-31.9	43-31.9	0.0
.71	35-22.7	35-22.5	+0.2	.96	43-49.8	43-49.9	-0.1
.72	35-45.5	35-45.2	+0.3	.97	44-07.5	44-07.6	-0.1
.73	36-08.1	36-07.8	+0.3	.98	44-25.0	44-25.3	-0.3
.74	36-30.4	36-30.1	+0.3	.99	44-42.3	44-42.7	-0.4
.75	36-52.5	36-52.2	+0.3	1.00	44-59.4	45-00.0	-0.6

Use of Formulas.

Given a 4° curve. $\Delta = 37°44'$. To find T.

$\frac{1}{2}\Delta = 18°52'$. By trial $\tan \frac{1}{2}\Delta$ is found to be between .3 and .4

since if tan = .4 in formula (6) A = 22°-0'

and if tan = .3 in formula (6) A = 17-0

Change of .1 in tan changes A by 5°-0'

$18°-52'$

$17-0$

$1°-52'$ $\quad \frac{1°52'}{5°}(.1) = .04 \quad .3+.04 = .34 =$ approximate $\tan \frac{1}{2}\Delta$.

$\tan \frac{1}{2}\Delta$ lies between .25 and .50 Therefore use formula (2)

If tan = .34 in formula (2) A = 18.78° = 18°-46.8'

If tan = .35 in formula (2) A = 19.292° = 19 - 17.5

Change of .01 in tan changes A by 0°-30.7'

$18°-52'$

$18-46.8$

$0°-05.2'$ $\quad \frac{5.2}{30.7}(.01) = .00169 \quad .34 + .00169 = .34169 = \tan \frac{1}{2}\Delta$.

By formula (7) $R = \frac{5729.58}{4} + .073(4) = 1432.69$

$T = R \tan \frac{1}{2}\Delta = 1432.69 \times .34169 = 489.54$

Exact $\tan 18°52' = .34173$, Error .00004

Exact T = 489.59, Error .05'

$\sin \frac{1}{2}\Delta$ and $\cos \frac{1}{2}\Delta$ may be derived from $\tan \frac{1}{2}\Delta$ by combining the two formulas,

$$\sin^2 \tfrac{1}{2}\Delta + \cos^2 \tfrac{1}{2}\Delta = \tan^2 \tfrac{1}{2}\Delta$$

and $$\frac{\sin \frac{1}{2}\Delta}{\cos \frac{1}{2}\Delta} = \tan \tfrac{1}{2}\Delta.$$

Also $\operatorname{vers} \frac{1}{2}\Delta = 1 - \cos \frac{1}{2}\Delta$. $\quad \operatorname{Exsec} \frac{1}{2}\Delta = \sec \frac{1}{2}\Delta - 1 = \frac{1}{\cos \frac{1}{2}\Delta} - 1$.

$E = R \operatorname{exsec} \frac{1}{2}\Delta$. $\quad C = 2R \sin \frac{1}{2}\Delta$. $\quad M = R \operatorname{vers} \frac{1}{2}\Delta$. $\quad X = R \sin \Delta$. $\quad Y = R \operatorname{vers} \Delta$.

Thus any function of a curve may be found by first finding $\tan \Delta$ or $\tan \frac{1}{2}\Delta$.

To find an angle whose tangent is greater than 1.00 find the angle corresponding to $\frac{1}{\tan}$ and subtract from 90°.

Given tan = 1.246 To find A.

$\frac{1}{1.246} = .8025682$

This number lies between .75 and 1.00 Therefore use formula (4).

Substituting tan = .8025682 in formula (4) gives 38°-44.8'

90° − (38°-44.8') = 51°-15.2' = A.

Exact A = 51°-15.0', Error 0°-0.2'

To find the tangent of an angle greater than 45° take the reciprocal of the tangent of (90° − the angle).

Required the tangent of 56°-43'.

90° − (56°-43') = 33°-17'

If tan = .7 in formula (6) A = 35°-0'

If tan = .6 in formula (6) A = 31-0

Change of .1 in tan changes A by 4°-0'

33°-17'

31-0

2°-17'

$\frac{2\frac{17}{60}}{4}(.1) = .06$ .6+.06 = .66 = approximate tan 33°-17'

Tan 33°-17' lies between .50 and .75 Therefore use formula (3)

If tan = .66 in formula (3) A = 33°-25.6'

If tan = .65 in formula (3) A = 33-01.5

Change of .01 in tan changes A by 0°-24.1'

33°-17'

33-01.5

0°-15.5'

$\frac{15.5}{24.1}(.01) = .00643$ .65+.00643 = .65643 = tan 33°-17'

$\frac{1}{.65643} = 1.52339 = \tan 56°-43'$

Exact tan 56°-43' = 1.52332, Error .00007